LIST OF EFFECTIVE PAGES

Chapter 32
LANDING GEAR

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*32	i	June 17/69	AB-9
*32	ii	June 17/69	AB-9
32	iii	June 22/64	AB-8
32	iv	June 22/64	AB-7
32	v	June 22/64	AB-7
32	vi	June 22/64	AB-7
32	vii	June 22/64	AB-4
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32	1	Jan. 25/63	AB-5
32	2	Mar. 1/62	AB-2
32	3	Sep. 17/62	AB-4
32	4	Jan. 25/63	AB-5
32	5	Sep. 17/62	AB-4
32	6	Jan. 25/63	AB-4
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32	8	Jan. 25/63	AB-5
32	9	Jan. 25/63	AB-5
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32	11	Jan. 25/63	AB-1
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32-0	1	Aug. 30/61	AB-1
32-0	2	Aug. 30/61	AB-1
32-0	3	Jan. 25/63	AB-2
32-0	4	Aug. 30/61	AB-1
32-0	5	Jan. 25/63	AB-2
32-0	6	Aug. 30/61	AB-1
32-0	7	Aug. 30/61	AB-1
32-0	8	Jan. 25/63	AB-2
32-0	201	Aug. 30/61	AB-1
32-0	202	Aug. 30/61	AB-1
32-0	203	Feb. 20/62	AB-2
32-0	204	Sep. 17/62	AB-2
32-0	205	Sep. 17/62	AB-3
32-0	206	Feb. 20/62	AB-2
32-0	207	Feb. 20/62	AB-2
32-0	208	Sep. 17/62	AB-3
32-0	209	Sep. 17/62	AB-3
32-0	210	Feb. 20/62	AB-2
32-0	211	Feb. 20/62	AB-2
32-0	212	May 15/63	AB-4
32-0	213	Feb. 20/62	AB-2
32-0	214	Jan. 25/63	AB-2
32-0	215	Jan. 25/63	AB-1
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CHAPTER	PAGE	DATE	CODE
32-1-0	1	Aug. 30/61	AB-1
32-1-0	2	Aug. 30/61	AB-1
32-1-0	3	Aug. 30/61	AB-1
32-1-0	4	Aug. 30/61	AB-1
32-1-0	5	Sep. 17/62	AB-2
32-1-0	6	Aug. 30/61	AB-1
32-1-0	7	July 26/63	AB-4
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32-1-0	101	Aug. 30/61	AB-1
32-1-0	102	Aug. 30/61	AB-1
32-1-0	201	Feb. 20/62	AB-1
32-1-0	202	Sep. 17/62	AB-2
32-1-0	203	Sep. 17/62	AB-2
32-1-0	204	Sep. 17/62	AB-2
32-1-0	205	June 22/64	AB-3
32-1-0	206	June 22/64	AB-3
32-1-0	207	Sep. 17/62	AB-2
32-1-0	208	Sep. 17/62	AB-2
32-1-0	209	June 22/64	AB-4
32-1-0	210	June 22/64	AB-2
32-1-0	211	Jan. 25/63	AB-2
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32-1-1	101	Aug. 30/61	AB-1
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32-1-1	201	Mar. 1/62	AB-1
32-1-1	202	Mar. 1/62	AB-1
32-1-1	203	Mar. 1/62	AB-1
32-1-1	204	Mar. 1/62	AB-1
32-1-1	205	Mar. 1/62	AB-1
32-1-1	206	Mar. 1/62	AB-1
32-1-1	207	May 15/63	AB-4
32-1-1	208	May 15/63	AB-3
32-1-1	209	May 15/63	AB-3
32-1-1	210	May 15/63	AB-3
32-1-1	211	May 15/63	AB-3
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32-1-2	201	Mar. 1/62	AB-1
32-1-2	202	Mar. 1/62	AB-1
32-1-2	203	Jan. 25/63	AB-2
32-1-2	204	Mar. 1/62	AB-1
32-1-2	205	Mar. 1/62	AB-1
32-1-2	206	June 22/64	AB-3
32-1-3	201	Mar. 1/62	AB-1
32-1-3	202	Mar. 1/62	AB-1

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CHAPTER	PAGE	DATE	CODE
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32-1-4	201	Mar. 1/62	AB-1
32-1-4	202	June 22/64	AB-2
32-1-4	203	June 22/64	AB-4
32-1-4	204	June 22/64	AB-3
32-1-5	101	Sep. 17/62	AB-2
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32-1-5	201	June 22/64	AB-4
32-1-5	202	Mar. 1/62	AB-1
32-1-6	201	June 22/64	AB-3
32-1-6	202	Aug. 30/61	AB-1
32-1-6	203	June 22/64	AB-3
32-1-6	204	June 22/64	AB-3
32-1-6	205	June 22/64	AB-3
32-1-6	206	June 22/64	AB-3
32-1-6	207	June 22/64	AB-3
32-1-6	208	June 22/64	AB-2
32-1-6	209	Mar. 1/62	AB-1
32-1-6	210	Mar. 1/62	AB-1
32-2-0	1	Aug. 30/61	AB-1
32-2-0	2	July 26/63	AB-3
32-2-0	3	Aug. 30/61	AB-1
32-2-0	4	Aug. 30/61	AB-1
32-2-0	5	Aug. 30/61	AB-1
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32-2-0	102	Aug. 30/61	AB-1
32-2-0	201	Aug. 30/61	AB-1
32-2-0	202	Aug. 30/61	AB-1
32-2-1	201	Jan. 25/63	AB-2
32-2-1	202	Jan. 25/63	AB-2
32-2-2	201	Jan. 25/63	AB-2
32-2-2	202	Jan. 25/63	AB-2
32-2-3	201	Jan. 25/63	AB-2
32-2-3	202	Jan. 25/63	AB-2
32-2-4	201	Jan. 25/63	AB-2
32-2-4	202	Jan. 25/63	AB-2
32-2-5	201	Jan. 25/63	AB-2
32-2-5	202	Jan. 25/63	AB-2
32-2-6	201	Jan. 25/63	AB-2
32-2-6	202	Jan. 25/63	AB-2
32-2-7	201	Mar. 1/62	AB-1
32-2-7	202	Jan. 25/63	AB-2
32-2-8	201	Mar. 1/62	AB-1
32-2-8	202	Jan. 25/63	AB-2
32-2-9	201	Jan. 25/63	AB-2
32-2-9	202	Jan. 25/63	AB-2
32-3-0	1	Aug. 30/61	AB-1
32-3-0	2	Aug. 30/61	AB-1
32-3-0	3	Sep. 17/62	AB-2
32-3-0	4	Sep. 17/62	AB-2
32-3-0	5	Aug. 30/61	AB-1
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32-3-0	201	Feb. 20/62	AB-1
32-3-0	202	Feb. 20/62	AB-1
32-3-0	203	Jan. 25/63	AB-3
32-3-0	204	July 26/63	AB-3
32-3-0	205	Feb. 20/62	AB-1
32-3-0	206	Feb. 20/62	AB-1
32-3-0	207	Feb. 20/62	AB-1
*32-3-0	208	June 17/69	AB-3
*32-3-0	209	June 17/69	AB-5
*32-3-0	210	June 17/69	AB-6
*32-3-0	211	June 17/69	AB-5
*32-3-0	212	June 17/69	AB-3
*32-3-0	213	June 17/69	AB-2
*32-3-0	214	June 17/69	AB-3
*32-3-0	215	June 17/69	AB-3
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32-3-1	201	July 26/63	AB-2
32-3-1	202	July 26/63	AB-2
32-3-1	203	Feb. 20/62	AB-1
32-3-1	204	Jan. 25/63	AB-2
32-3-1	205	Jan. 25/63	AB-2
32-3-1	206	Jan. 25/63	AB-3
32-3-1	207	May 15/63	AB-3
32-3-1	208	May 15/63	AB-3
32-3-1	209	Sep. 17/62	AB-2
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32-3-2	201	Feb. 20/62	AB-1

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32-3-2	204	Jan. 25/63	AB-1
32-3-3	201	Feb. 20/62	AB-1
32-3-3	202	Feb. 20/62	AB-1
32-3-3	203	May 15/63	AB-3
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32-3-4	201	Feb. 20/62	AB-1
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*32-3-5	201	June 22/64	AB-3
32-3-5	202	Sep. 17/62	AB-2
32-3-5	203	Sep. 17/62	AB-2
32-3-5	204	Feb. 20/62	AB-2
32-3-5	205	Feb. 20/62	AB-2
*32-3-5	206	June 22/64	AB-3
*32-3-5	207	June 22/64	AB-3
32-3-5	208	Feb. 20/62	AB-1
32-3-5	209	Feb. 20/62	AB-1
32-3-5	210	Feb. 20/62	AB-1
32-3-6	201	Sep. 17/62	AB-1
*32-3-6	202	June 22/64	AB-2
32-3-6	203	Sep. 17/62	AB-1
*32-3-6	204	June 22/64	AB-2
32-4-0	1	Jan. 25/63	AB-3
32-4-0	2	Jan. 25/63	AB-3
32-4-0	3	Jan. 25/63	AB-2
32-4-0	4	Jan. 25/63	AB-2
32-4-0	101	Aug. 30/61	AB-1
32-4-0	102	Aug. 30/61	AB-1
32-4-0	201	Aug. 30/61	AB-1
32-4-0	202	Aug. 30/61	AB-1
32-4-1	201	Sep. 17/62	AB-2
32-4-1	202	Sep. 17/62	AB-2
32-4-2	201	Jan. 25/63	AB-2
32-4-2	202	Mar. 1/62	AB-1
32-4-2	203	Jan. 25/63	AB-1
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32-4-3	201	Mar. 1/62	AB-1
32-4-3	202	Mar. 1/62	AB-1
32-4-3	203	Jan. 25/63	AB-2
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32-4-4	201	Jan. 25/63	AB-2
32-4-4	202	Jan. 25/63	AB-2
32-4-5	201	Jan. 25/63	AB-2
32-4-5	202	Mar. 1/62	AB-1
32-4-5	203	Jan. 25/63	AB-1
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32-5-0	1	Aug. 30/61	AB-1
32-5-0	2	Aug. 30/61	AB-1
32-5-0	201	Sep. 17/62	AB-2
32-5-0	202	Aug. 30/61	AB-1
32-5-0	203	Aug. 30/61	AB-1
32-5-0	204	Sep. 17/62	AB-2
32-5-1	201	Feb. 20/62	AB-1
32-5-1	202	Feb. 20/62	AB-1
32-5-1	203	Jan. 25/63	AB-2
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32-5-2	201	Feb. 20/62	AB-1
32-5-2	202	Feb. 20/62	AB-1
32-5-2	203	Jan. 25/63	AB-2
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32-5-3	201	Sep. 17/62	AB-1
32-5-3	202	Sep. 17/62	AB-1
32-5-3	203	Sep. 17/62	AB-1
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32-6-0	1	Jan. 25/63	AB-3
32-6-0	2	Aug. 30/61	AB-1
32-6-0	3	Jan. 25/63	AB-1
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32-6-0	201	Feb. 20/62	AB-1
32-6-0	202	Sep. 17/62	AB-2
32-6-0	203	Sep. 17/62	AB-2
32-6-0	204	Feb. 20/62	AB-1
32-6-0	205	Feb. 20/62	AB-1
32-6-0	206	Sep. 17/62	AB-2
32-6-0	207	Sep. 17/62	AB-2
32-6-0	208	Sep. 17/62	AB-2
*32-6-0	209	June 22/64	AB-3
*32-6-0	210	June 22/64	AB-3
32-6-0	211	Sep. 17/62	AB-2
32-6-0	212	Sep. 17/62	AB-2
32-6-0	213	Jan. 25/63	AB-2
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*32-6-1	201	June 22/64	AB-2
*32-6-1	202	June 22/64	AB-2
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32-6-2	202	Mar. 1/62	AB-1
32-6-2	203	Mar. 1/62	AB-1
32-6-2	204	Mar. 1/62	AB-1
32-6-2	205	Jan. 25/63	AB-2
32-6-2	206	Jan. 25/63	AB-1
32-6-3	201	Sep. 17/62	AB-2
32-6-3	202	Mar. 1/62	AB-1
32-6-3	203	Sep. 17/62	AB-2
32-6-3	204	Sep. 17/62	AB-2
32-6-3	205	Sep. 17/62	AB-1
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32-7-0	1	Aug. 30/61	AB-1
32-7-0	2	Aug. 30/61	AB-1
32-7-0	101	Aug. 30/61	AB-1
32-7-0	102	Aug. 30/61	AB-1
32-7-0	201	Aug. 30/61	AB-1
32-7-0	202	Aug. 30/61	AB-1
32-7-0	203	Aug. 30/61	AB-1
32-7-0	204	Aug. 30/61	AB-1
*32-7-0	205	June 22/64	AB-3
32-7-0	206	Aug. 30/61	AB-1
*32-7-0	207	June 22/64	AB-2
*32-7-0	208	June 22/64	AB-4
*32-7-0	209	June 22/64	AB-3
*32-7-0	210	June 22/64	AB-3
32-7-1	201	Mar. 1/62	AB-1
32-7-1	202	Mar. 1/62	AB-1
32-7-1	203	Mar. 1/62	AB-1
*32-7-1	204	June 22/64	AB-2
*32-7-1	205	June 22/64	AB-3
32-7-1	206	Jan. 25/63	AB-2
32-7-2	201	Jan. 25/63	AB-2
32-7-2	202	Mar. 1/62	AB-1
32-7-2	203	Jan. 25/63	AB-2
32-7-2	204	Jan. 25/63	AB-1
32-8-0	1	Jan. 25/63	AB-4
32-8-0	2	Jan. 25/63	AB-3
32-8-0	3	Jan. 25/63	AB-4
32-8-0	4	Jan. 25/63	AB-3
32-8-0	5	Jan. 25/63	AB-4
32-8-0	6	Jan. 25/63	AB-4
32-8-0	7	Jan. 25/63	AB-3
32-8-0	8	Jan. 25/63	AB-1
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32-8-0	12	Jan. 25/63	AB-1
32-8-0	101	Jan. 25/63	AB-2
32-8-0	102	Jan. 25/63	AB-2
32-8-0	103	Jan. 25/63	AB-2
32-8-0	104	Jan. 25/63	AB-2
32-8-0	105	Jan. 25/63	AB-3
32-8-0	106	Jan. 25/63	AB-3
32-8-0	107	Jan. 25/63	AB-3
32-8-0	108	Jan. 25/63	AB-3
32-8-0	109	Jan. 25/63	AB-3
32-8-0	110	Jan. 25/63	AB-3
32-8-0	111	Jan. 25/63	AB-1
32-8-0	112	Jan. 25/63	AB-1
32-8-0	113	Jan. 25/63	AB-1
32-8-0	114	Jan. 25/63	AB-1
32-8-0	201	Jan. 25/63	AB-3
32-8-0	202	Jan. 25/63	AB-3
32-8-0	202A	May 15/63	AB-3
*32-8-0	202B	June 22/64	AB-2
*32-8-0	203	June 22/64	AB-4
*32-8-0	204	June 22/64	AB-5
32-8-0	204A	July 26/63	AB-3
32-8-0	204B	July 26/63	AB-2
32-8-0	205	Sep. 17/62	AB-2
32-8-0	206	Aug. 30/61	AB-1
32-8-0	207	Jan. 25/63	AB-3
32-8-0	208	Jan. 25/63	AB-3
32-8-0	209	May 15/63	AB-5
32-8-0	210	May 15/63	AB-5
32-8-0	211	Jan. 25/63	AB-3
32-8-0	212	Jan. 25/63	AB-3
32-8-0	213	Jan. 25/63	AB-3
32-8-0	214	July 26/63	AB-4
32-8-0	215	Jan. 25/63	AB-3
32-8-0	216	July 26/63	AB-3
32-8-0	217	Jan. 25/63	AB-2
32-8-0	218	Jan. 25/63	AB-1
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32-8-2	204	Mar. 1/62	AB-1
*32-8-2	205	June 22/64	AB-3
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32-8-3	202	Mar. 1/62	AB-1
32-8-3	203	Jan. 25/63	AB-2
32-8-3	204	Jan. 25/63	AB-2
32-8-4	201	Mar. 1/62	AB-1
32-8-4	202	Mar. 1/62	AB-1
32-8-5	201	Mar. 1/62	AB-1
32-8-5	202	Mar. 1/62	AB-1
32-8-5	203	Mar. 1/62	AB-1
32-8-5	204	Mar. 1/62	AB-1
32-8-6	201	Mar. 1/62	AB-2
32-8-6	202	Sep. 17/62	AB-2
32-8-6	203	Sep. 17/62	AB-2
32-8-6	204	Mar. 1/62	AB-2
32-8-6	205	Aug. 30/61	AB-1
32-8-6	206	Mar. 1/62	AB-2
*32-8-6	207	June 22/64	AB-2
*32-8-6	208	June 22/64	AB-2
32-8-7	201	Mar. 1/62	AB-1
32-8-7	202	Mar. 1/62	AB-1
32-8-8	201	Jan. 25/63	AB-2
32-8-8	202	Mar. 1/62	AB-1
32-8-8	203	Mar. 1/62	AB-1
32-8-8	204	Jan. 25/63	AB-2
32-8-9	201	Jan. 25/63	AB-3
32-8-9	202	Jan. 25/63	AB-3
32-8-9	203	Sep. 17/62	AB-2
32-8-9	204	Jan. 25/63	AB-2
32-8-10	101	Aug. 30/61	AB-1
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32-8-10	201	Sep. 17/62	AB-2
32-8-10	202	Mar. 1/62	AB-1
32-8-10	203	Sep. 17/62	AB-2
32-8-10	204	Sep. 17/62	AB-2
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32-8-11	202	Mar. 1/62	AB-1
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32-8-18	201	Jan. 25/63	AB-1
32-8-18	202	Jan. 25/63	AB-1
32-9-0	1	July 26/63	AB-2
32-9-0	2	July 26/63	AB-2
32-9-0	201	Sep. 17/62	AB-3
32-9-0	202	Sep. 17/62	AB-3
*32-9-1	201	June 22/64	AB-2
*32-9-1	202	June 22/64	AB-2
32-9-2	201	Sep. 17/62	AB-2
32-9-2	202	Sep. 17/62	AB-2
32-9-3	201	Sep. 17/62	AB-1
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32-9-4	201	Sep. 17/62	AB-1
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32-10-0	102	Sep. 17/62	AB-2
32-10-0	103	Sep. 17/62	AB-2
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32-10-0	107	Sep. 17/62	AB-2
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32-10-2	201	Jan. 25/63	AB-2
32-10-2	202	Mar. 1/62	AB-1
32-10-3	201	Jan. 25/63	AB-2
32-10-3	202	Mar. 1/62	AB-1
32-10-4	201	Jan. 25/63	AB-2
32-10-4	202	Jan. 25/63	AB-2
32-10-5	201	Jan. 25/63	AB-2
32-10-5	202	Mar. 1/62	AB-1
32-10-6	201	Jan. 25/63	AB-2
32-10-6	202	Mar. 1/62	AB-1
32-10-7	201	Jan. 25/63	AB-2
32-10-7	202	Mar. 1/62	AB-1
32-10-8	201	Jan. 25/63	AB-2
32-10-8	202	Mar. 1/62	AB-1
32-10-9	201	Jan. 25/63	AB-2
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LANDING GEAR

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TEMPORARY REVISION NO. 32-56.

Insert facing 32-0, Page 3, dated Jan. 25/63 (or subsequent).

The illustration on the noted facing page is applicable to all airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-37, delete the following item where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete the antiskid system test switch on the overhead switch panel.

LANDING GEAR SYSTEM - DESCRIPTION AND OPERATION

1. General

The retractable tricycle landing gear consists of a steerable nose landing gear (NLG) assembly and two main landing gear (MLG) assemblies; see Figure 1. The nose landing gear is powered by the No. 1 hydraulic system and retracts forward, and up, into the nose wheel well. The main landing gear is powered by the No. 2 hydraulic system and retracts inward and up into wheel wells in the fuselage and wing. Door operation is sequenced so that the doors open for gear retraction or extension, then close and lock to complete the cycle. In an emergency, a cable system will release the gear and door up-locks, vent hydraulic pressure to return, and open the main landing gear doors. The gear will then free-fall to the down and locked position.

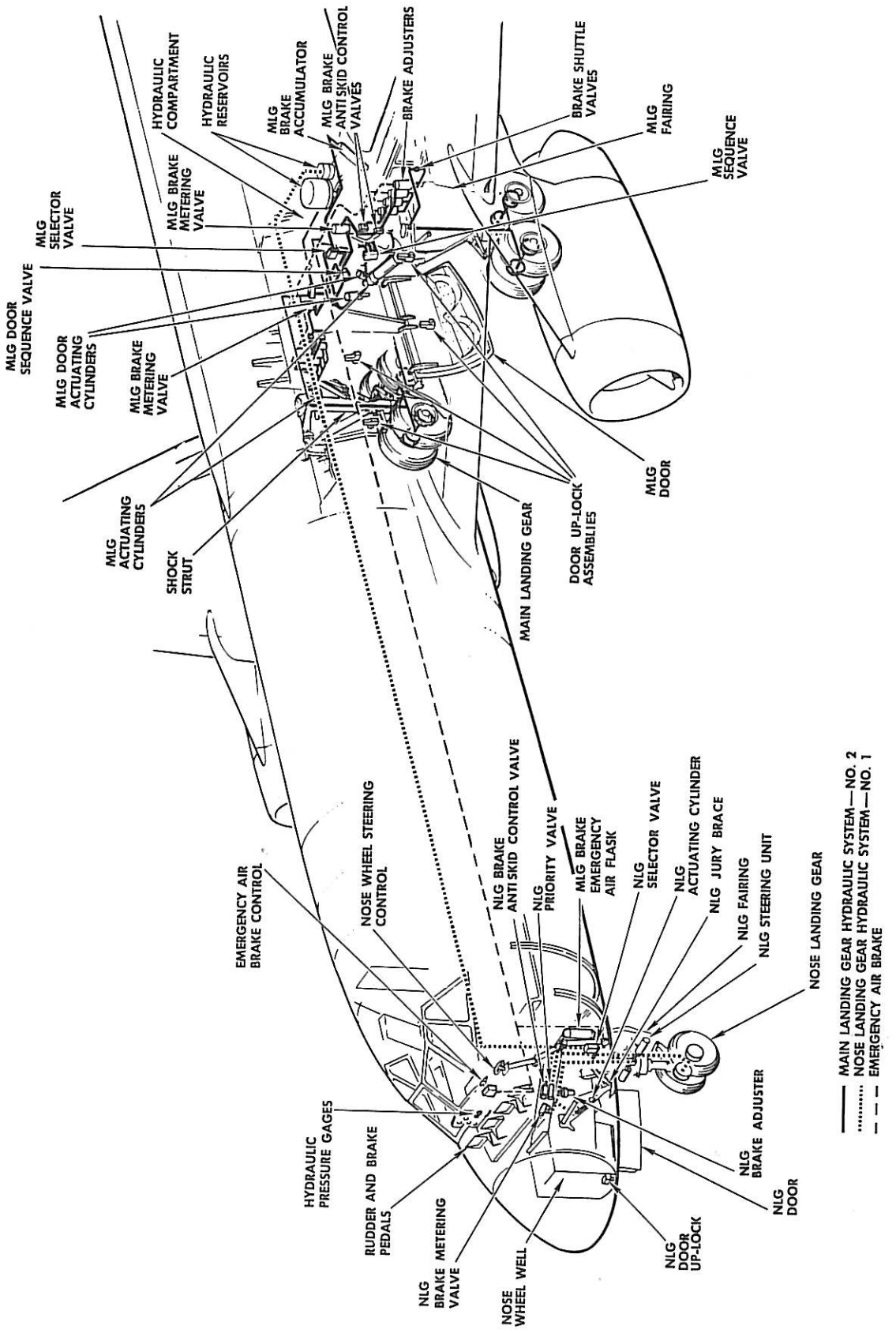
Each main landing gear assembly has four wheel and brake assemblies which are mounted in tandem pairs on an "H" frame. The "H" frame, with component parts, is called a truck and is capable of rotating in a vertical plane through 32-1/2 degrees. Truck rotation compensates for changes in terrain and landing attitudes. The main landing gear wheel wells are each enclosed by a door and a fairing. The fairing is hinged just below and outboard of the main landing gear trunnion, and is mechanically linked to the shock strut. Each main landing gear door is hinged at the inboard edge and is operated by two hydraulic actuating cylinders, one at the forward and aft edge of each door. The doors are normally closed and locked when the gear is extended, but may be opened manually on the ground with a ground release handle located in the hydraulic compartment. If the doors are manually opened on the ground, they must be manually closed and locked prior to flight.

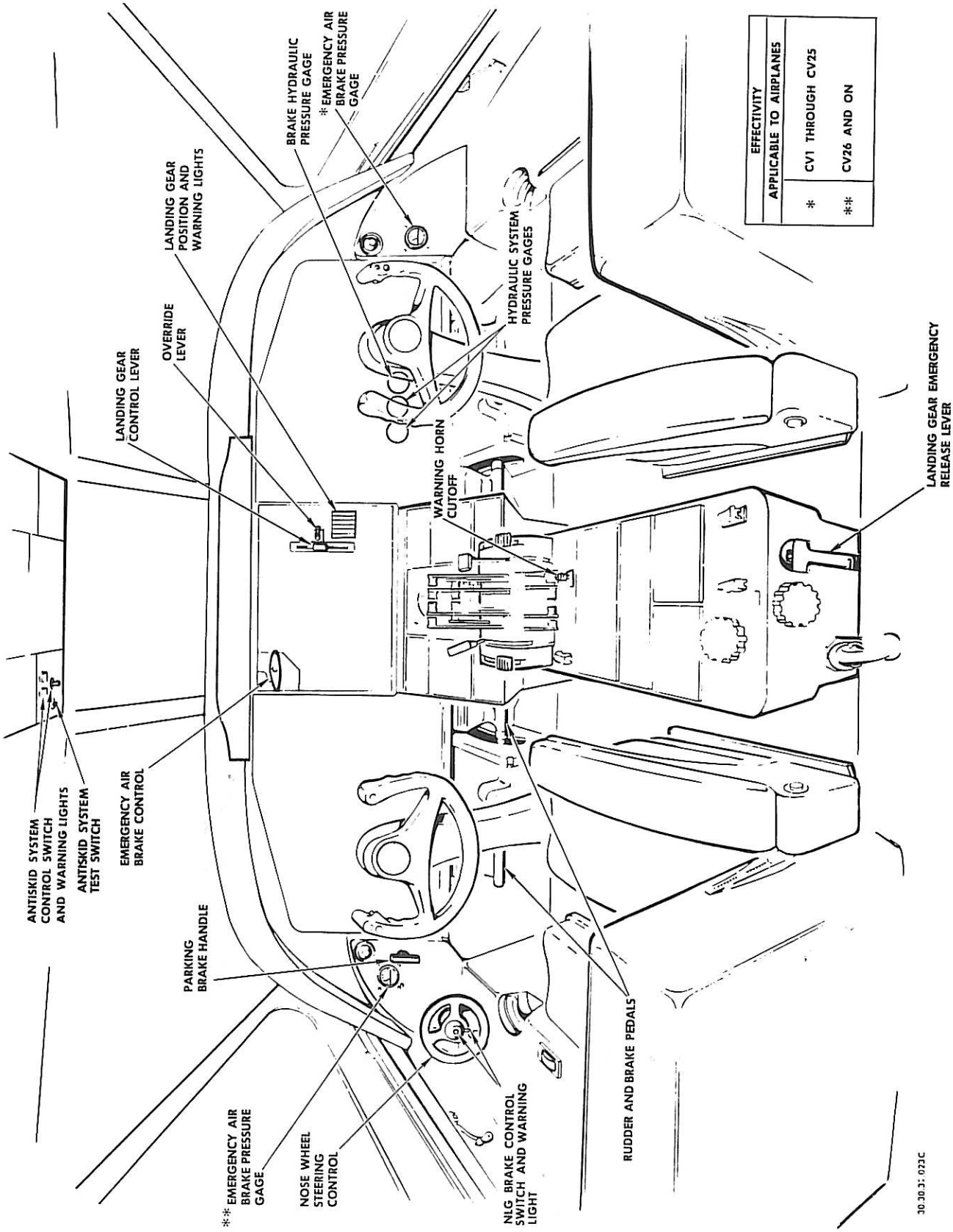
The nose landing gear has co-rotating steerable wheel and brake assemblies. Two clamshell doors and a fairing enclose the nose wheel well when the gear is retracted. The doors are controlled by movement of the gear, through a mechanical linkage between the gear and doors. The doors are closed in both the extended and retracted positions of the gear; however, they lock only with the gear retracted. The doors may be opened on the ground by two release latches which are part of the actuating linkage.

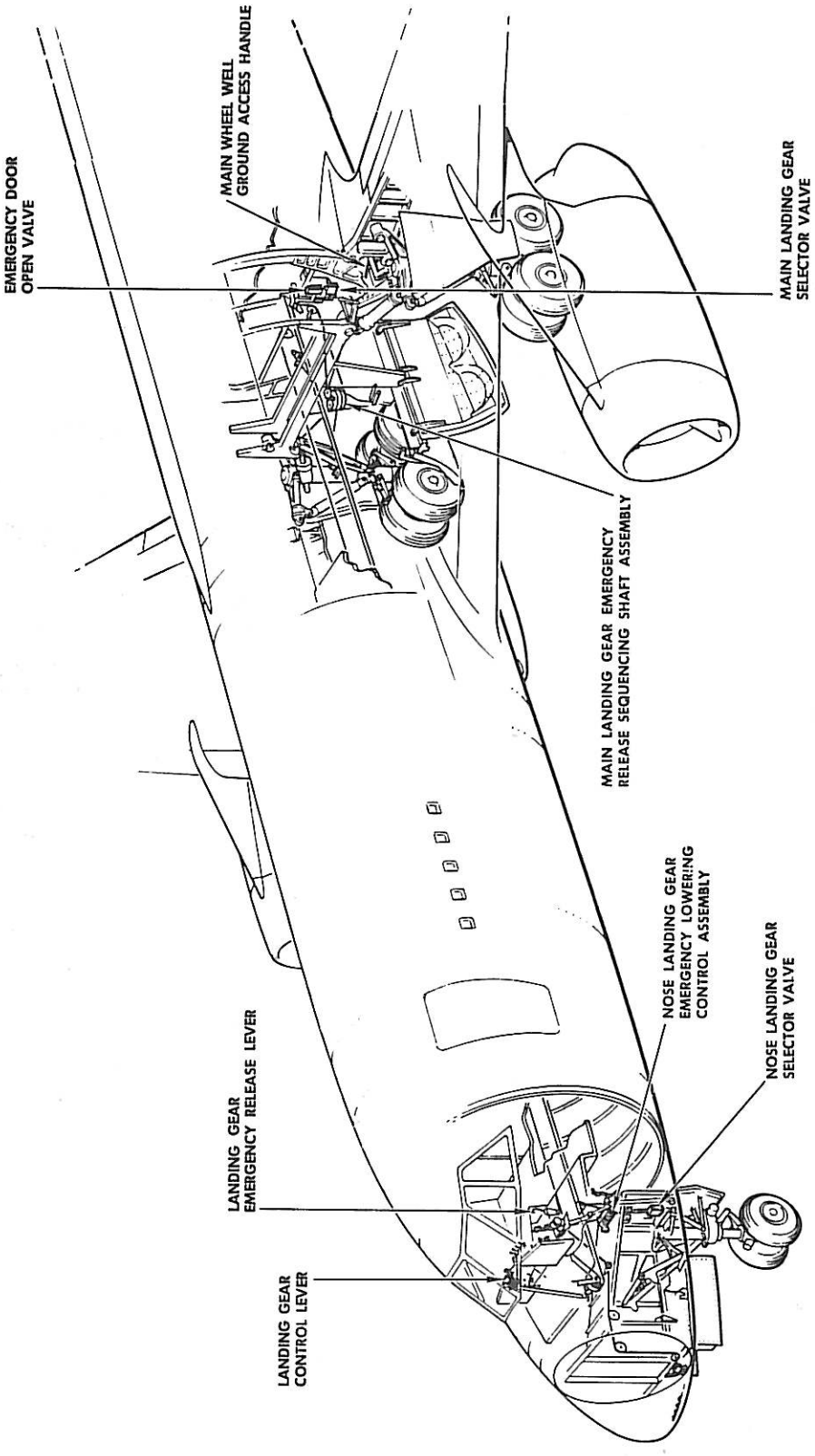
2. Controls

The landing gear system controls consist of a landing gear normal control lever and a landing gear emergency release lever; see Figures 2 and 3. The normal control lever has three positions: UP, NEUTRAL and DOWN. The lever is placed in the NEUTRAL position during flight to relieve pressure in the landing gear hydraulic systems. On the ground, the control lever is locked in the DOWN position by a solenoid-controlled locking pin. The locking pin solenoid is energized and deenergized by actuation of the left MLG ground safety switch, provided the truck position switches and the main landing gear sequence valves are properly positioned for gear retraction.

The landing gear emergency release lever is mechanically connected to the gear and door up-locks. Actuation of the lever vents all landing gear


HYDRAULIC COMPARTMENT
HYDRAULIC RESERVOIRS
MLG BRAKE ACCUMULATOR
MLG BRAKE ANTI SKID CONTROL VALVES
BRAKE ADJUSTERS
BRAKE SHUTTLE VALVES
MLG FAIRING
MLG SEQUENCE VALVE
MLG SELECTOR VALVE
MLG BRAKE METERING VALVE
MLG DOOR SEQUENCE VALVE
MLG DOOR ACTUATING CYLINDERS
MLG BRAKE METERING VALVE
MLG ACTUATING CYLINDERS
SHOCK STRUT
MLG DOOR
DOOR UP-LOCK ASSEMBLIES
MAIN LANDING GEAR
EMERGENCY AIR BRAKE CONTROL
NOSE WHEEL STEERING CONTROL
NLG BRAKE ANTI SKID CONTROL VALVE
NLG PRIORITY VALVE
MLG BRAKE EMERGENCY AIR FLASK
NLG SELECTOR VALVE
NLG ACTUATING CYLINDER
NLG JURY BRACE
NLG FAIRING
NLG STEERING UNIT
NOSE LANDING GEAR
HYDRAULIC PRESSURE GAGES
RUDDER AND BRAKE PEDALS
NLG BRAKE METERING VALVE
NOSE WHEEL WELL
NLG DOOR UP-LOCK
NLG BRAKE ADJUSTER
NLG DOOR
MAIN LANDING GEAR HYDRAULIC SYSTEM—NO. 2
NOSE LANDING GEAR HYDRAULIC SYSTEM—NO. 1
EMERGENCY AIR BRAKE
30.30.32.001B


EFFECTIVITY
APPLICABLE TO AIRPLANES
* CV1 THROUGH CV25
** CV26 AND ON
BRAKE HYDRAULIC PRESSURE GAGE
* EMERGENCY AIR BRAKE PRESSURE GAGE
LANDING GEAR POSITION AND WARNING LIGHTS
HYDRAULIC SYSTEM PRESSURE GAGES
OVERRIDE LEVER
LANDING GEAR CONTROL LEVER
WARNING HORN CUTOFF
LANDING GEAR EMERGENCY RELEASE LEVER
ANTISKID SYSTEM CONTROL SWITCH AND WARNING LIGHTS
ANTISKID SYSTEM TEST SWITCH
EMERGENCY AIR BRAKE CONTROL
PARKING BRAKE HANDLE
** EMERGENCY AIR BRAKE PRESSURE GAGE
NOSE WHEEL STEERING CONTROL
NLG BRAKE CONTROL SWITCH AND WARNING LIGHT
RUDDER AND BRAKE PEDALS
30.30.31 023C



Landing Gear Normal and Emergency Controls
Figure 3

hydraulic lines to the return lines to prevent a hydraulic lock, and opens a valve to supply air pressure to open the main landing gear doors. If the pneumatic door opening system fails to operate, gravity, acting on the main gear, pushes the doors open and allows the gear to extend.

3. Landing Gear Position and Warning System

The landing gear position and warning system consists of lights and a warning horn; see Figure 4. Three green lights, one for each gear, illuminate when the gear is down and locked. Two red lights, one for the landing gear and one for the landing gear doors, illuminate to warn of any unsafe condition. A single amber light illuminates to indicate that the gear trucks or the main landing gear sequence valves are not in a safe position for gear retraction. All of the aforementioned lights are located on the pilots' center instrument panel. Each light has two lamps wired in parallel so that a single lamp failure does not give a false indication. If a gear unsafe or gear down-and-locked indicator becomes inoperative in flight, a visual check of the gear down-locks may be made through windows located in the nose wheel well aft bulkhead and in the top of the main wheel wells.

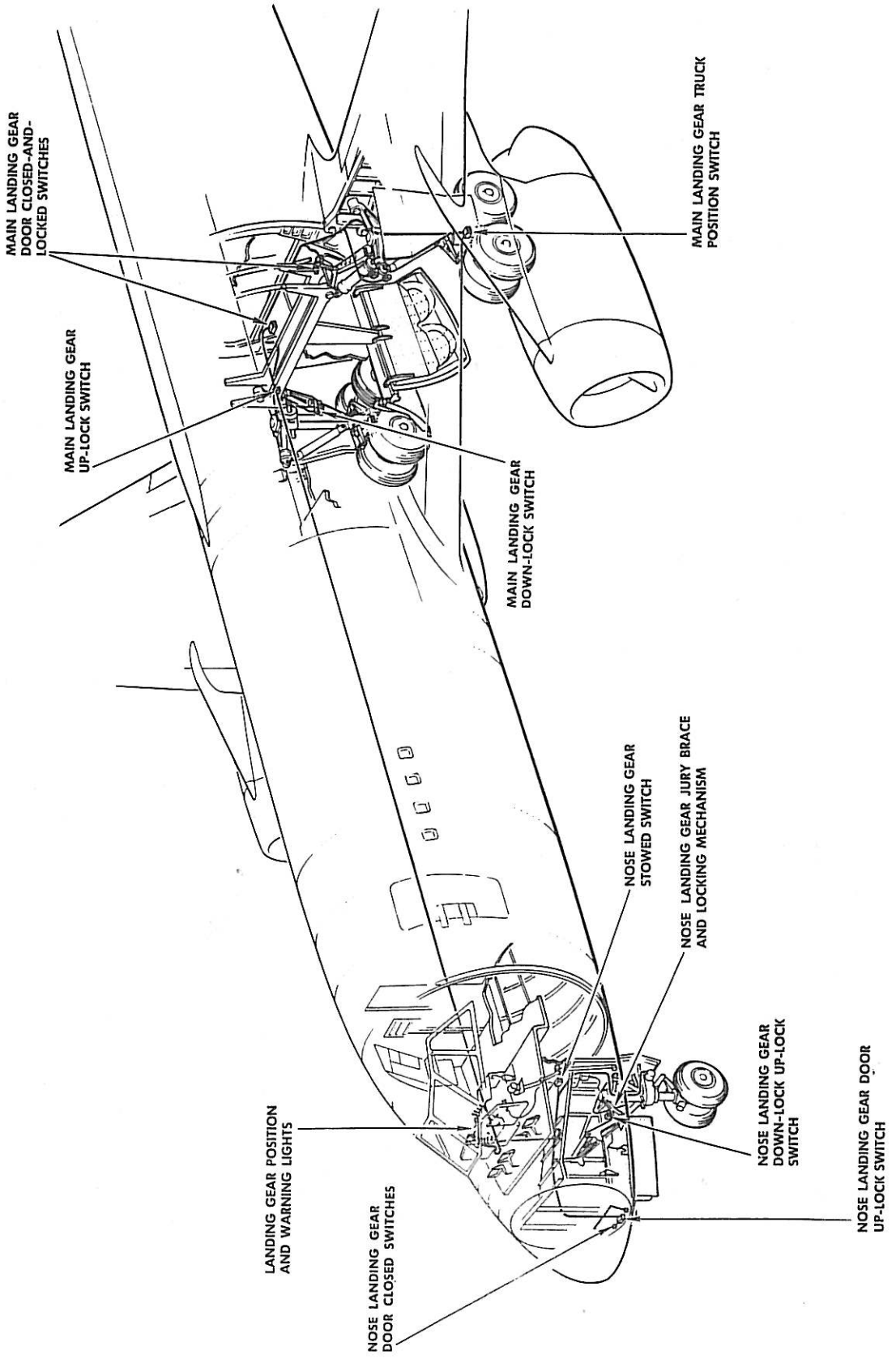
The warning horn sounds steadily when the airplane is airborne and any power lever (throttle) is retarded below 75 percent rpm and the gear is not down and locked. The horn also sounds on the ground if the landing gear control lever is not locked in the DOWN position.

4. Landing Gear Brakes

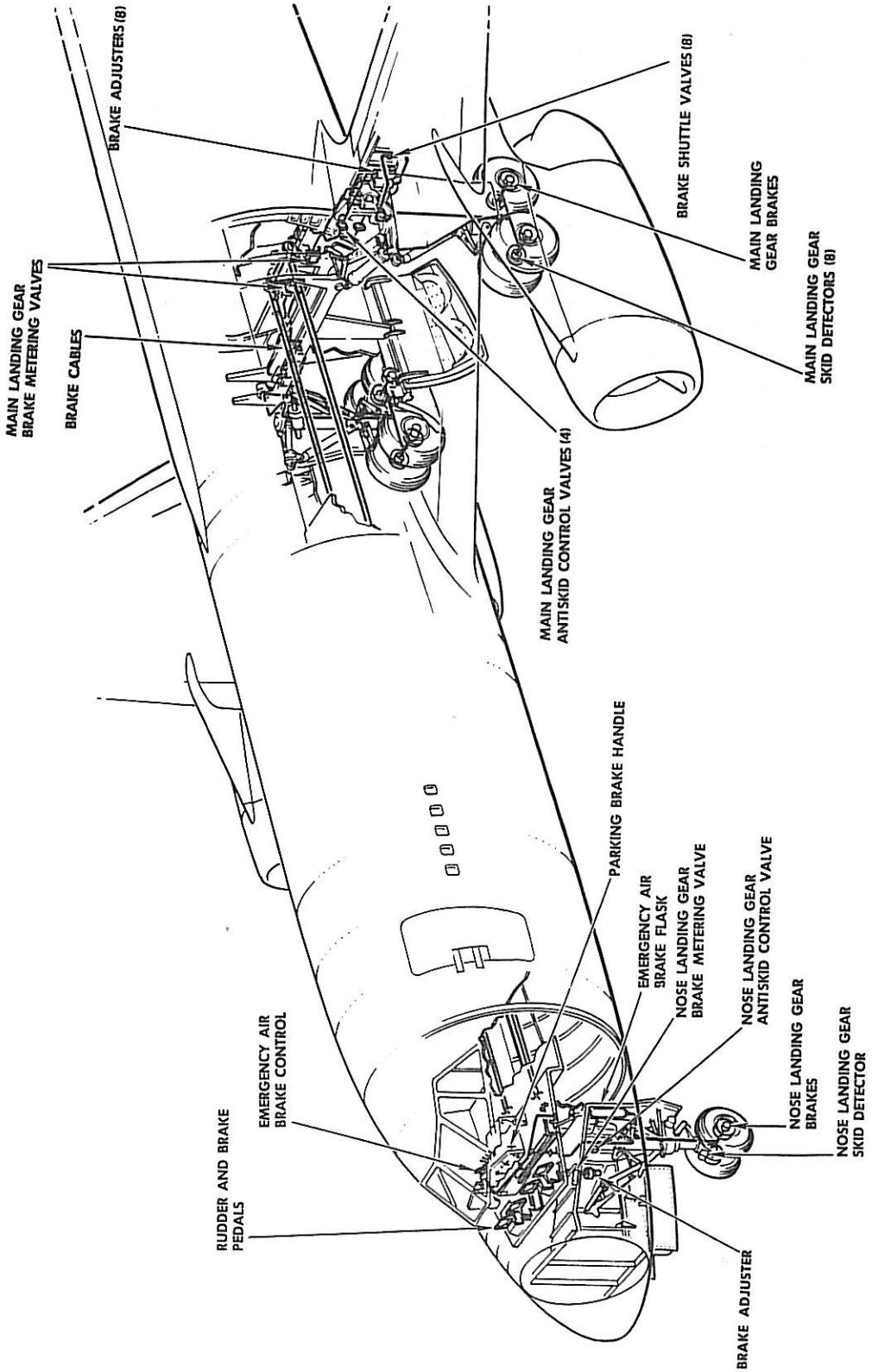
The nose and main landing gear wheels are equipped with hydraulically actuated, disc-type brakes; see Figure 5. Toe pressure exerted against the upper portion of combination rudder and brake pedals controls brake actuation. Main landing gear brake actuation is in proportion to amount the brake pedals are depressed. The nose landing gear brakes on *Group I airplanes CV1 thru CV4 and CV25 and on, actuate only when brake pedals are depressed beyond approximately 96 percent of full pedal travel; only full braking pressure is available at nose wheel brakes. *Group II airplanes CV5 thru CV24, in addition, have reduced braking pressure available at the nose landing gear brakes. This reduced braking pressure is applied at approximately one half brake pedal travel and phases into full braking at approximately 96 percent of full pedal travel.

Additional features of the landing gear brake systems consist of the following: The nose landing gear brakes lock out automatically when nose wheels are steered beyond approximately seven degrees left or right of center. The nose wheel brakes can also be shut off by an "on-off" switch on the pilot's nose wheel steering handwheel. The main landing gear brakes are locked for parking by depressing the brake pedals and pulling out on the parking brake handle. Emergency braking power is supplied by a pneumatic system that operates the main gear brakes only. The nose and main landing gear brakes actuate automatically during gear retraction, to stop wheel rotation after takeoff.

*Refer to Manual INTRODUCTION for Explanation of Group Designations.



Landing Gear Position and Warning System
Figure 4


BRAKE ADJUSTERS (8)
BRAKE SHUTTLE VALVES (8)
MAIN LANDING GEAR BRAKES
MAIN LANDING GEAR SKID DETECTORS (8)
MAIN LANDING GEAR BRAKE METERING VALVES
BRAKE CABLES
MAIN LANDING GEAR ANTISKID CONTROL VALVES (4)
PARKING BRAKE HANDLE
EMERGENCY AIR BRAKE FLASK
NOSE LANDING GEAR BRAKE METERING VALVE
NOSE LANDING GEAR ANTISKID CONTROL VALVE
EMERGENCY AIR BRAKE CONTROL
NOSE LANDING GEAR BRAKES
NOSE LANDING GEAR SKID DETECTOR
RUDDER AND BRAKE PEDALS
BRAKE ADJUSTER
30.30.32.005A

During normal braking operations, an antiskid system detects and prevents skidding of the tires. This provides maximum braking action without danger of skidding. If the antiskid system malfunctions, the normal manual brake system for the main landing gear will operate, but without antiskid protection; the nose landing gear brake system will deactivate.

5. Nose Wheel Steering

The nose landing gear incorporates a hydraulically-driven steering unit with a powered steering range of 65 degrees (nominal) right and left of center. The steering unit is the rack and pinion type and is mounted on the shock strut cylinder. The assembly consists of a control valve, actuated by a chain and cable system, and a dual actuating cylinder. The No. 1 hydraulic system furnishes hydraulic power for nose wheel steering operation.

Nose wheel steering is controlled by a handwheel located on the pilot's console panel. If the hydraulic system malfunctions, nose wheel steering is accomplished through differential use of the main landing gear brakes.

LANDING GEAR SYSTEM - MAINTENANCE PRACTICES

1. Servicing Landing Gear System (refer to Chapter 12, SERVICING)

2. Adjustment/Test Landing Gear System - Operational Check

A. Scope of Work Involved.

(1) This operational checkout provides an overall method of checking the operation of the entire landing gear system. To isolate a malfunctioning component, refer to the applicable system Trouble Shooting for instructions.

(2) Prior to conducting this test, the landing gear must be properly rigged per Adjustment/Test procedures contained in chapter sections 32-1-0, 32-3-0, 32-5-0, 32-6-0, and 32-13-0.

B. Equipment Required.

(1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering up to 3000 psig at 16 gpm.

NOTE: The hydraulic test unit shall have a metering device to limit landing gear extension or retraction time to 15 seconds minimum.

(2) Airplane jacking equipment.

(3) External source of 115/200 volt, 3-phase, 400 cps ac electrical power.

(4) Guard rails to keep personnel out of the wheel well areas.

(5) Landing gear jack to raise and lower landing gear trucks.

(6) Spring scale capable of measuring 0 to 50 pounds in one-pound increments.

(7) Force measuring device capable of measuring 100 to 150 pounds to check landing gear emergency release lever loads.

(8) Spring scale capable of measuring 100 to 150 pounds to check gear emergency extension.

C. Preparation.

(1) With main and nose landing gear in the down-and-locked position, install ground safety pins. Check that landing gear normal control lever is in the DOWN position.

(2) Check that main and nose gear shock struts are properly serviced (refer to Chapter 12, SERVICING).

(3) Check that truck positioners are properly serviced (refer to Chapter 12, SERVICING).

(4) Jack airplane at wing and fuselage jack points until landing gear wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING).

(5) Make certain hydraulic systems are properly filled and bled (refer to Chapter 12, SERVICING).

(6) Check accumulators for the following pressures.

(a) Hydraulic system No. 1 and No. 2 accumulators shall read 900 (±100) psig.

(b) MLG brake accumulator shall read 900 (±100) psig.

NOTE: The above pressure tolerances apply to airplane gages only. For correct servicing pressures, refer to Chapter 12, SERVICING.

(7) Connect hydraulic test unit to No. 1 and No. 2 hydraulic systems (refer to Chapter 29, HYDRAULIC POWER).

CAUTION: DO NOT ALLOW DIRT OR ANY OTHER FOREIGN MATERIAL TO ENTER HYDRAULIC SYSTEMS.

(8) If required, lubricate main and nose landing gear -- check lubrication records (refer to Chapter 12, SERVICING).

(9) Close landing gear doors; check that door latches are seated.

(10) Connect external source of ac power to airplane (refer to Chapter 24, ELECTRICAL POWER).

(11) Close (push in) the following circuit breakers on main circuit breaker panel:

(a) LANDING GEAR POS & WARN.

(b) LH and RH LANDING GEAR GRD SAFETY RELAYS.

(c) LANDING GEAR HANDLE SOLENOID.

(d) WARN HORN.

(12) Check that landing gear override WARN HORN fuse is installed in the dc power and emergency bus box at main circuit breaker panel.

(13) Place guard rails around wheel well areas.

D. Operational Check - Landing Gear System, Normal Operation.

(1) Check that the following landing gear position lights (green) on the pilots' center instrument panel are illuminated.

(a) LH MAIN.

(b) RH MAIN.

(c) NOSE.

(2) All other landing gear warning lights shall be extinguished.

(3) Check the MLG truck position switches as follows:

(a) Check that the left MLG truck assembly is in neutral position.

NOTE: With the truck assembly in the neutral position the distance between centers of the two attaching bolts on the truck positioner is 17.41 (±0.01) inches (centerline of forward axle is 3.70 (±0.06) inches lower than centerline of aft axle).

(b) With neutral position established, observe LDG TRUCK POS light (amber) and jack the aft wheels on left MLG truck. The LDG TRUCK POS light shall illuminate when truck positioner has been compressed 0.23 (±0.01) inch from neutral position (when centerline of aft axle has traveled upward 0.90 (±0.10) inch from neutral position).

CAUTION: DO NOT EXCEED TRUCK JACKING LIMITS SPECIFIED IN CHAPTER 7, LIFTING AND SHORING.

(c) Gently try to move landing gear normal control lever to NEUTRAL. Control lever shall not move.

CAUTION: DO NOT OVERRIDE CONTROL LEVER LOCK PIN.

(d) Slowly return MLG truck to neutral position. LDG TRUCK POS light shall extinguish.

(e) Jack forward wheels on left MLG truck. The LDG TRUCK POS light shall illuminate when truck positioner has been extended 0.23 (±0.01) inch from neutral position (when centerline of aft axle has traveled downward 0.90 (±0.10) inch from neutral position).

CAUTION: DO NOT EXCEED TRUCK JACKING LIMITS SPECIFIED IN CHAPTER 7, LIFTING AND SHORING.

(f) Gently try to move landing gear normal control lever. Control lever shall not move.

CAUTION: DO NOT OVERRIDE CONTROL LEVER LOCK PIN.

(g) Return left MLG truck to neutral position. LDG TRUCK POS light shall extinguish.

(h) Repeat steps (a) through (g), substituting right for left MLG truck.

(4) Check the MLG ground safety switches as follows:

(a) Actuate the left and right MLG ground safety switches to the groundborne position by inserting a wooden wedge under each switch roller.

(b) Gently try to move landing gear normal control lever to NEUTRAL. Control lever shall not move.

(c) Actuate manual override lever. Warning horn shall sound continuously and GEAR UNSAFE warning light shall illuminate.

(d) Deleted.

(e) Release manual override lever. Warning horn shall cease to sound and GEAR UNSAFE warning light shall extinguish.

(f) Return left and right MLG ground safety switches to airborne position.

(5) Check landing gear retraction as follows:

(a) Remove landing gear ground safety pins.

WARNING: CLEAR PERSONNEL AND EQUIPMENT FROM WHEEL WELL AREAS.

(b) Advance all four engine power control levers above 92 percent rpm (approximately 37 degrees control lever travel from IDLE THRUST position).

(c) Move landing gear normal control lever to UP position. Force required to raise lever shall be 15 (±5) pounds.

(d) Apply sufficient hydraulic power to retract gear slowly (15 seconds minimum).

CAUTION: WATCH FOR BINDING, LAG, OR INTERFERENCE BETWEEN GEAR COMPONENTS, LINES AND ADJACENT STRUCTURE.

1) As door up-locks are released, red LDG DOOR light shall illuminate.

2) MLG doors shall open as NLG starts to retract.

3) The instant the NLG jury brace is unlocked, the green NOSE light shall extinguish and the red GEAR UNSAFE light shall illuminate.

4) The NLG shall retract and its doors close and lock.

5) The MLG doors shall open, and both main gear shall retract and lock.

6) The MLG doors shall close and lock.

7) The green lights for LH and RH MLG shall extinguish the instant the down-locks release on their respective gear.

8) When all three gear are up and locked, the red GEAR UNSAFE light shall extinguish.

9) When all doors are closed and locked, the red LDG DOOR light shall extinguish.

(e) With landing gear retracted and doors closed and locked, retard any one power control lever below 75 percent rpm (approximately 11 degrees control lever travel from IDLE THRUST position). Warning horn shall sound continuously.

(f) Return retarded power control lever to position above 92 percent rpm (approximately 37 degrees control lever travel from IDLE THRUST position). Warning horn shall silence.

(g) Repeat steps (e) and (f) for each power control lever.

(6) Check gear extension as follows:

(a) Retard any one power control lever below 75 percent rpm (approximately 11 degrees control lever travel from IDLE THRUST position). Warning horn shall sound continuously.

(b) Move landing gear control lever to the DOWN position. Force required to move the lever shall be 15 (±5) pounds.

(c) Slowly apply hydraulic power and limit flow to provide a 15-second minimum extension time.

1) Landing gear doors shall open, gear shall extend and lock, and the doors shall close.

2) Red LDG DOOR light shall illuminate the instant the first door is unlocked.

3) Red GEAR UNSAFE light shall illuminate when first gear is unlocked.

4) The amber LDG TRUCK POS light may illuminate when main gear is in transit to the down-and-locked position (if hydraulic pressure in main gear down lines is high enough to actuate main gear sequence valve pressure switches).

NOTE: Illumination of LDG TRUCK POS light is normal during main gear extension; however, light must extinguish when main gear doors close following gear extension.

5) Each gear green light shall illuminate when its respective gear is down and locked.

6) When all gear are down and locked, the warning horn shall silence.

E. Operational Check - Twenty-Five Cycle Test.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING). Check the accumulators per step 2.C.(6).

(2) Apply hydraulic power and adjust flow to limit landing gear retraction or extension time to 15 seconds minimum.

(3) Move landing gear normal control lever to UP position. Landing gear shall retract smoothly to the up-and-locked position.

(4) Move landing gear normal control lever to the DOWN position. Landing gear shall extend smoothly to the down-and-locked position.

(5) Repeat steps (3) and (4) twenty-five times. Landing gear shall operate smoothly throughout twenty-five cycle test without change or adjustment of any landing gear component.

F. Operational Check - Short Cycle Test.

(1) Apply hydraulic power and adjust flow to limit landing gear retraction or extension time to 15 seconds minimum.

(2) Move landing gear normal control lever to UP position. When landing gear is retracted approximately half way, return control lever to the DOWN position.

(a) Landing gear shall move smoothly toward the up position while control lever is in the UP position.

(b) When control lever is returned to DOWN position, landing gear shall return smoothly to the down-and-locked position.

(3) Repeat step (2) five times. Landing gear shall operate smoothly without change or adjustment of any landing gear component.

(4) Retract landing gear to the up-and-locked position.

(5) Move landing gear normal control lever to the DOWN position. When landing gear is approximately half way extended, return control lever to the UP position.

(a) Landing gear shall move smoothly toward the down position while control lever is in the DOWN position.

(b) When control lever is returned to the UP position, landing gear shall return smoothly to the up-and-locked position.

(6) Repeat step (5) five times. Landing gear shall operate smoothly without change or adjustment of any landing gear component.

G. Operational Check - Gear Emergency Extension.

(1) With landing gear up and locked and the landing gear normal control lever in NEUTRAL position, reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Check that hydraulic system No. 2 accumulator is charged to 900 (±100) psig.

NOTE: Above pressure tolerance applies to airplane gage only. Refer to Chapter 12, SERVICING for correct servicing pressure.

(3) Rotate landing gear emergency release lever to full down position.

(a) Lever travel to release MLG and NLG shall not exceed 98 degrees. (98 degrees lever travel is equivalent to a perpendicular measurement of 8.40 inches between tip of emergency release lever and flight compartment floor.)

(b) Force required to move emergency release lever through full travel shall not exceed 120 pounds.

CAUTION: AT NO TIME SHALL A LOAD IN EXCESS OF 130 POUNDS BE APPLIED TO THE LANDING GEAR EMERGENCY RELEASE LEVER.

(c) Main landing gear doors shall open.

(d) Left and right MLG shall extend to the down-and-locked position.

NOTE: The main landing gear must free fall before the nose gear. If the nose gear free falls first, the landing gear emergency control system is not rigged correctly. Check MLG up-lock emergency release cable adjustment (refer to 32-6-0).

(e) Nose landing gear doors shall open.

(f) Nose landing gear shall either extend to the down-and-locked position, or shall not require more than 30 pounds force to pull the gear into the down-and-locked position.

NOTE: Additional force required to fully extend NLG shall be applied by attaching a line and spring scale to the NLG. Attach line to NLG in such a manner that force will be applied to center point of NLG axle. Maintain line and spring scale perpendicular to NLG strut centerline when applying force.

(g) Nose landing gear doors shall close.

(h) LH MAIN, NOSE, and RH MAIN gear position lights (green) shall illuminate when respective gear is down and locked.

(i) LDG DOOR light shall remain illuminated.

(4) Reset emergency control system by pushing emergency release lever back up to the normal position.

(5) Apply external hydraulic power and limit flow to provide a 15-second, minimum, retraction time.

(6) Cycle gear up and down at least twice to bleed air from hydraulic systems.

(7) Raise landing gear to the up-and-locked position. Leave landing gear normal control lever in the UP position and hydraulic systems pressurized.

(8) Rotate landing gear emergency release lever to the full down position.

CAUTION: DO NOT APPLY MORE THAN A 130-POUND LOAD TO EMERGENCY RELEASE LEVER.

(a) Nose and main landing gear doors shall open.

(b) Nose and main landing gear shall free fall toward the down-and-locked position.

NOTE: If necessary, apply a spring-scale force of 150 pounds at the MLG truck to extend gear.

(9) Move landing gear normal control lever to NEUTRAL position.

(10) Return landing gear emergency release lever to the normal (up) position.

CAUTION: DO NOT PLACE EMERGENCY RELEASE LEVER IN THE NORMAL (UP) POSITION UNLESS THE LANDING GEAR NORMAL CONTROL LEVER IS IN NEUTRAL.

(11) Actuate the landing gear normal control lever to the DOWN position.

(12) Cycle gear up and down at least twice to bleed air from hydraulic systems.

H. Operational Check - MLG Wheel Well Ground Access.

WARNING: DURING THE FOLLOWING OPERATIONAL CHECK, PERSONNEL MUST REMAIN CLEAR OF MLG DOORS.

(1) Install ground safety pins in the nose and main landing gear.

(2) Actuate MLG wheel well ground access handle safety trigger (hydraulic compartment) and move handle aft. Both MLG doors shall open.

(3) Permit safety trigger to secure handle in aft position.

(4) With No. 2 hydraulic system pressurized, manually close left-hand MLG door to permit door safety roller to contact door frame.

(5) Actuate safety trigger. It should not be possible to move handle forward.

NOTE: If ground access handle can be moved forward, the right-hand MLG door will close, indicating a misrigged ground access cable (refer to 32-6-0 for adjustment).

(6) Release safety trigger and secure handle in the aft locked position.

(7) Manually close right-hand MLG door (with left-hand MLG door still closed).

(8) Actuate and hold safety trigger; move ground access handle forward. Door latches shall secure the doors in the closed-and-locked position.

WARNING: DO NOT CLOSE MLG DOORS UNLESS HYDRAULIC POWER IS ON AIRPLANE. THIS WILL INSURE THAT DOORS ARE CLOSED AND LOCKED WHEN RETURNING HANDLE TO NORMAL (FORWARD) POSITION.

(9) Release safety trigger and secure handle in the forward locked position.

I. Restore airplane to normal configuration.

(1) Install landing gear ground safety pins.

(2) Charge No. 2 hydraulic system accumulator with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(3) Remove external source of electrical power from airplane (refer to Chapter 24, ELECTRICAL POWER).

(4) Remove external source of hydraulic power from airplane (refer to Chapter 29, HYDRAULIC POWER).

(5) Lower airplane to the ground and remove jacks (refer to Chapter 7, LIFTING and SHORING).

3. Inspection/Check Landing Gear System - Visual Check

A. Visually check the following:

(1) Shock struts, trunnions, drag braces, side braces, actuators, torque arms, truck assembly (H frame) and all metal parts including forgings, welded parts, and machined parts for evidence of structural damage, nicks, burrs, pits, cracks, corrosion, and scoring.

(2) Evidence of rubbing or damage because of misalignment during retraction - extension cycle.

(3) Landing gear doors and fairing for aerodynamic smoothness, cleanliness, corrosion, dents, cracks, wear, distortion, loose bolts and rivets, and door seals for deterioration or damage.

(4) Electrical harnesses, clips, connections, truck position switches, safety switches, and the down-lock and up-lock switches for cleanliness, corrosion, damage and general security.

(5) Landing gear door actuating mechanisms, up-locks and linkage for damage, corrosion and security.

(6) Wheels and brakes for cracks, dents and scoring.

(7) Screws, bolts, and nuts for evidence of cross threading, stripping or scoring.

(8) Nose wheel steering assembly and components for corrosion, cracks, distortion and wear. Check steering control cables, Teflon fairlead washers, pins, and snap rings for damage.

(9) All painted surfaces for chips or scratches.

(10) Shock struts for proper inflation (refer to Chapter 12, SERVICING).

(11) Tires for alignment of slippage marks, cuts, uneven tread wear, flat spots, saturation of Skydrol 500, and proper inflation (refer to Chapter 12, SERVICING).

4. Inspection/Check Landing Gear Thin-Walled High Heat Treat Components

A. General

The following information is furnished as general inspection/check data for all thin-walled high heat treat parts of the nose and main landing gear. Careful consideration must be given to any and all impact dents, scratches, gouges or any deformity from normal surface or original configuration. The thin-walled high heat treat components of the landing gear include the following:

(1) MLG cylinder and piston (oleo) assembly.

(2) MLG drag brace.

(3) MLG side brace.

(4) MLG upper jury brace.

(5) MLG truck and axle assembly.

(6) NLG cylinder and piston (oleo) assembly.

(7) NLG side braces.

(8) NLG jury brace.

(9) NLG lower drag brace.

(10) NLG co-rotating (inner) axle.

B. Damage Limits - Dents and Abrasions.

(1) Dents. A dent is any deformation affecting outside and/or inside diameter of a component. Dents may be caused by slowly applied loads or by impact. Any dent 0.005 inch or greater in depth may result in cracks in the inside diameter of a part or member. Dents to this extent are cause for immediate removal of component and thorough inspection and rework.

CAUTION: DENTS OF LESS THAN 0.005 INCH SHOULD BE TREATED IN THE SAME MANNER AS DENTS OF 0.005 INCH OR MORE IF IT IS KNOWN THAT THEY WERE CAUSED BY: SEVERE PRESSURE, FORCEFUL IMPACTION, OR BY MALFUNCTION OR LOSS OF AIR PRESSURE IN THE MLG TRUCK POSITIONER. IN ADDITION, THE SAME CHECKS REQUIRED FOR DENTS SHOULD BE ACCOMPLISHED FOR A LANDING GEAR WHICH HAS ABSORBED AN IMPACT OF MAJOR INTENSITY, EVEN THOUGH NO DENTS ARE FOUND BY A VISUAL CHECK.

(2) Abrasions. Abrasions include scratches, gouges, or nicks not caused by severe pressure or impact. However, because abrasions can result in early fatigue failure or cracks, the same inspection/check and rework procedures as used for dents should be used.

C. Inspection and Rework.

For further inspection and rework of thin-walled high heat treat components refer to the Overhaul Manual.

5. Inspection/Check Landing Gear Hydraulic Components - Visual Check

A. Visually check for the following:

(1) Hydraulic lines for evidence of fluid leakage, rubbing, cracks, damage and general security.

(2) Truck positioner (centering cylinder) for proper precharge (refer to Chapter 12, SERVICING).

(3) Main landing gear actuating cylinders, up-lock actuators, down-lock actuators, and door actuating cylinders around "O" ring packings, pistons, and at hydraulic connections for leakage, damage, and general security.

(4) Oleo struts around piston below gland nut areas for fluid leakage.

(5) Main landing gear and door sequence valves, and gear selector valve for leakage at hydraulic connections, damage and general security.

(6) Brake metering valves, antiskid control valves, brake adjusters, and shuttle valves for leakage at hydraulic connections, damage and security.

(7) Nose landing gear actuating cylinder, up-lock actuating cylinder, door up-lock cylinder, gear selector valve, and door up-lock sequence valve for hydraulic leakage, damage, and general security.

6. Cleaning/Painting Landing Gear

A. Materials Required.

(1) Dry cleaning solvent, Federal Specification P-S-661B or equivalent.

(2) Hydraulic oil, Specification MIL-H-6083.

(3) Epoxy primer, Convair Specification 03021, Type I (Andrew Brown Company, Los Angeles, California).

(4) Epoxy Enamel, Convair Specification 03021, Type II (Andrew Brown Company, Los Angeles, California).

(5) Soft fiber brush or cloth.

(6) Oiled paper to cover tires and rubber door seals.

B. Clean all exposed surfaces - painted and plated.

(1) Cover wheel assemblies and tires and exposed rubber door seals with oiled paper to prevent exposure to solvent.

(2) Remove mud by applying a stream of water and scrubbing with fiber brush or cloth.

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-36.

Insert facing 32-0, Page 212, dated Sep. 17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-2, substitute the following instruction where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 5.A.(2) and replace with the following:

(2) Truck positioner (centering cylinder) for evidence of fluid leakage and for proper precharge (refer to Chapter 12, SERVICING).

(3) Remove heavy deposits of tar or asphalt by scrubbing with fiber brush dipped in dry cleaning solvent, Federal Specification P-S-661B or equivalent.

CAUTION: DO NOT ALLOW CLEANING SOLVENT TO CONTACT TIRES OR BRAKE ASSEMBLIES.

(4) Clean and coat exposed chromed surface of shock strut piston with hydraulic oil, Specification MIL-H-6083, using clean, lint-free, soft cloth.

NOTE: To reduce excessive wear and possible failure of strut packing rings: When extreme ice, dust, mud or sand conditions are encountered, the chromed surface of the strut piston should be wiped clean and coated with hydraulic oil before each flight. When operating during low temperature conditions, the strut piston should be cleaned and oiled immediately after landing to prevent ice from forming on the piston.

(5) Touch up chipped and scratched painted surfaces with epoxy primer and enamel (refer to Chapter 51, STRUCTURES GENERAL).

NOTE: If schedule makes it impractical to apply epoxy primer and enamel use zinc chromate primer and aluminum lacquer to protect area until next base overhaul.

7. Epoxy Enamel Removal Landing Gear - High Heat Treat Components

A. Materials Required.

(1) Epoxy Stripper Delchem Ezy-Strip 19A, Delco Chemical Inc., Los Angeles, California.

NOTE: An alternate paint stripper is Turco 3994, Turco Products Inc., Los Angeles, California. However, until extent of hydrogen embrittlement is determined in high treat steel (excess of 220 ksi) it is recommended that Delchem Ezy-Strip 19A be used.

(2) Aliphatic Naptha.

(3) Clean soft cloth.

B. Remove Epoxy Enamel.

(1) Apply epoxy stripper to area to be stripped.

CAUTION: DO NOT APPLY EPOXY STRIPPER TO MAGNESIUM PARTS.

WARNING: EPOXY STRIPPER WILL BURN SKIN. USE ADEQUATE SAFETY PRECAUTIONS.

(2) Allow stripper to remain on surface until enamel is softened enough to wipe off. Remove softened enamel with a clean, soft cloth and flush with water.

(3) Rinse with aliphatic naphtha and rewipe.

(4) Refinish with epoxy primer and enamel (refer to Chapter 51, STRUCTURES GENERAL).

8. Inspection/Check Landing Gear Attachment - Maximum Wear Limits

See Table I for MLG and NLG attachment fitting and bushing data and maximum allowable wear limits; the amount of wear should be determined by direct measurement. Refer to the Structural Repair Manual for bushing and fitting rework if maximum allowable clearances are exceeded.

9. Approved Repairs

NOTE: Pending final test, repairs to the landing gear are limited to replacement, cleaning, and paint retouching.

TABLE I

LANDING GEAR ATTACHMENT DATA AND ALLOWABLE WEAR LIMITS

LOCATION AND PART NAME	ORIGINAL DIAMETER (INCHES)	CLEARANCE PER MANUFACTURER'S TOLERANCES (INCH)	*MAXIMUM ALLOWABLE CLEARANCE (INCH)
MLG FORWARD TRUNNION ATTACHMENT			
MLG Forward Attachment Adapter Bushings, Wing Rear Spar (30-17935-7)	$1.8743^{+0.0026}_{-0.0000}$ I.D.	0.0009/0.0045	0.0065
Forward Trunnion Bolt (Cleveland Pneumatic Tool Company P/N 9991C-85)	1.8734/1.8724		
MLG AFT TRUNNION ATTACHMENT			
Spherical Bearing, MLG Beam (30-05414-1/-2)	$3.5000^{+0.0015}_{-0.0000}$ I.D.	0.0022/0.0047	0.0065
Aft Trunnion Pin (Cleveland Pneumatic Tool Co. P/N 9991C-14)	3.4978/3.4968		
MLG UPPER SIDE BRACE ATTACHMENT			
Side Brace Adapter Bushings, Fuselage (30-73704-7)	$2.1237^{+0.0010}_{-0.0000}$ I.D.	0.0003/0.0023	0.0035
Side Brace Pivot Pins (Cleveland Pneumatic Tool Co. P/N 9991C-159/-161)	2.1234/2.1224		
NLG SHOCK STRUT TRUNNION ATTACHMENT			
Trunnion Bushings, Wheel Well (30-52101-15)	$2.0000^{+0.0010}_{-0.0000}$ I.D.	0.0016/0.0036	0.0055
Trunnion Pins (Cleveland Pneumatic Tool Company P/N 9992C-15)	1.9984/1.9974		
NLG DRAG BRACE TRUNNION ATTACHMENT			
Trunnion Bushings, Wheel Well (30-52101-11)	$2.2500^{+0.0012}_{-0.0000}$ I.D.	0.0018/0.0040	0.0060
Trunnion (Cleveland Pneumatic Tool Co. P/N 9992C-79)	2.2482/2.2472		

*Maximum allowable clearances are given with assumption that respective parts have not been altered and are as dimensioned on engineering drawings.

MAIN LANDING GEAR (MLG) - DESCRIPTION AND OPERATION

1. General

Each main landing gear assembly consists of an air-oil shock strut, a truck assembly, a hydraulic actuating cylinder, and the struts and braces necessary for connecting the components and attaching them to the airplane; see Figure 1. Pressure lubrication fittings are provided at all points where connecting moving parts are subject to friction and wear. Each MLG side brace assembly also contains a grounding lug near the lower end to connect airplane grounding cables. These lugs should always be used when grounding the airplane to prevent damaging landing gear finish.

Each main landing gear assembly attaches to the airplane at three points. Two of these points are trunnions which carry most of the supporting load of the airplane. The trunnions also serve as pivots for retracting the gear. The third attaching point is at the upper end of the side brace assembly. A jury brace located between the knuckle joint of the side brace and the upper end of the shock strut supports the gear down-lock. When the gear is retracted, the down-lock is hydraulically actuated to allow the jury brace and side brace to fold and permit the main gear to swing inward and up into the wheel well. An up-lock assembly at the upper end of the side brace holds the gear in the up-and-locked position.

Each wheel assembly on the main landing gear has a multiple-disc hydraulic brake, and a skid detector. This arrangement permits individual braking control by the antiskid system. A ground safety switch is installed on each main gear to prevent retraction of the gear while the airplane is on the ground, and to control the operation of other equipment in the airplane. Another switch monitors the position of the truck assembly in relation to the shock strut, and will prevent retraction of the gear if the truck is not properly positioned to fit into the wheel well.

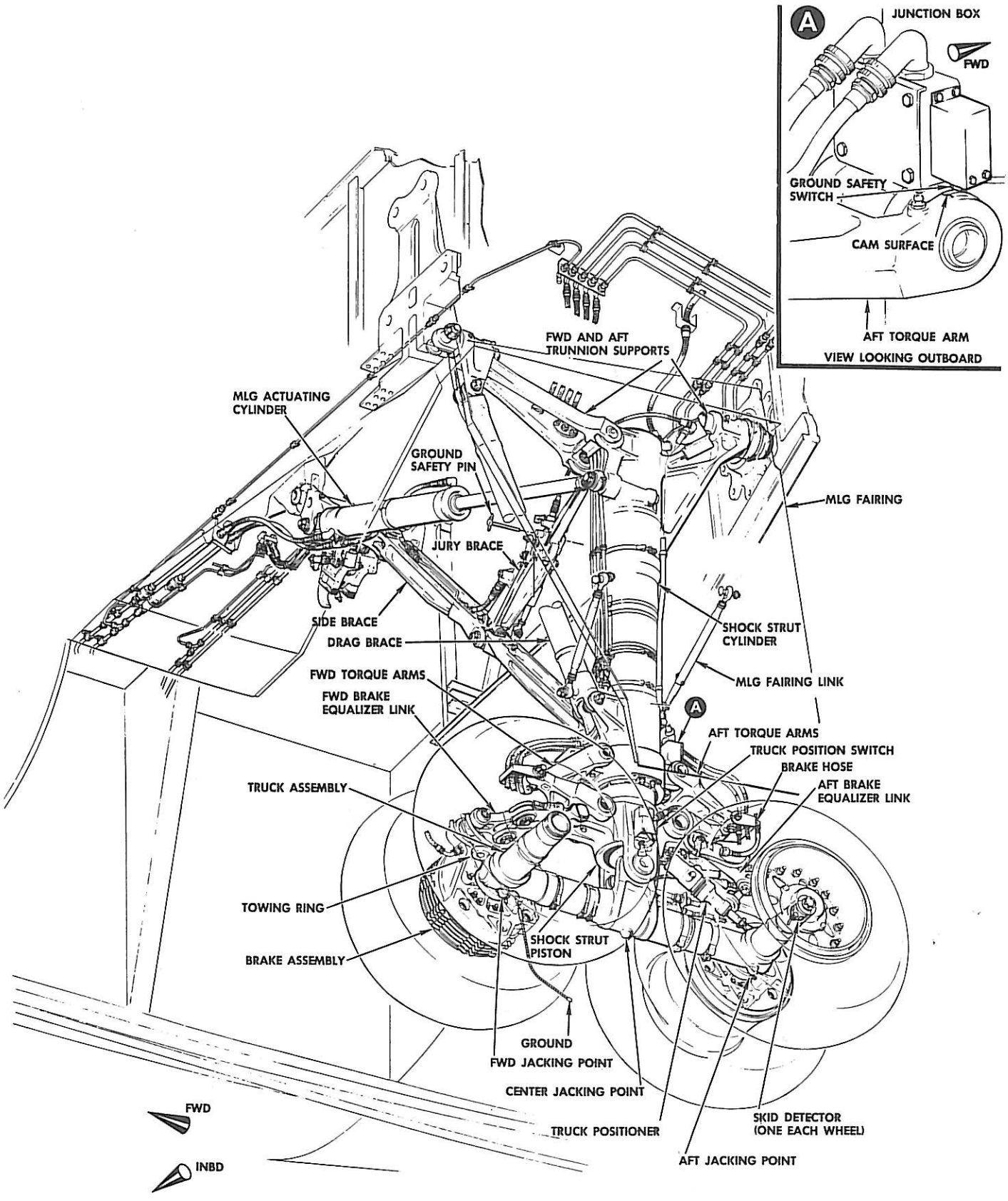
Two sets of torque arms are connected to each main landing gear strut. The torque arms are folding links which prevent rotation of the shock strut piston in the cylinder and thereby keep the wheels properly aligned.

2. Main Landing Gear (MLG) Side Brace

The MLG side brace assembly consists of modified "I" beam forgings which transmit lateral loads from the main landing gear to the airplane structure. It also acts as the folding member to permit landing gear retraction, and supports the gear up-lock. The upper end of the side brace assembly is attached to the fuselage structure and the lower end is attached to the shock strut. Both the upper and lower connections are hinged in two directions. One direction permits folding for gear retraction, and the other allows for bending from touchdown or braking forces. The side brace is hinged in the middle to permit folding for gear retraction.

3. Main Landing Gear (MLG) Up-Lock

The MLG up-lock is located at the upper end of the side brace assembly. When the gear is retracted, a roller mounted on the shock strut cylinder


A
JUNCTION BOX
FWD
GROUND SAFETY SWITCH
CAM SURFACE
AFT TORQUE ARM
VIEW LOOKING OUTBOARD
FWD AND AFT TRUNNION SUPPORTS
MLG ACTUATING CYLINDER
GROUND SAFETY PIN
MLG FAIRING
JURY BRACE
SIDE BRACE
DRAG BRACE
SHOCK STRUT CYLINDER
FWD TORQUE ARMS
FWD BRAKE EQUALIZER LINK
MLG FAIRING LINK
AFT TORQUE ARMS
TRUCK POSITION SWITCH
BRAKE HOSE
AFT BRAKE EQUALIZER LINK
TRUCK ASSEMBLY
TOWING RING
BRAKE ASSEMBLY
SHOCK STRUT PISTON
GROUND
FWD JACKING POINT
CENTER JACKING POINT
TRUCK POSITIONER
SKID DETECTOR (ONE EACH WHEEL)
AFT JACKING POINT
FWD
INBD
30.30.32.006A

contacts the up-lock hook. The roller pushes the hook and connecting toggle links, with assist from the up-lock actuating cylinder and spring cartridges, to an overcenter position to hold the gear up and locked. The actuating cylinder and spring cartridges also move the hook to the unlocked position for normal gear extension. A cable release is provided for gear emergency extension. Figure 2 illustrates the main landing gear up-lock.

The MLG up-lock also connects to the MLG door sequence valve through a mechanical linkage. When the gear is retracted, movement of the gear up-lokc actuates the MLG door sequence valve and closes the MLG doors. The gear up-lock also actuates the MLG door sequence valve to open the MLG doors during gear extension cycle.

4. Main Landing Gear (MLG) Jury Brace

The MLG jury brace is located between the side brace knuckle joint and the shock strut; see Figure 3. The jury brace prevents the MLG side brace from inadvertently folding and locks the main landing gear in the down position. The jury brace is unlocked and folds at its center point when the main landing gear is retracted.

5. Main Landing Gear (MLG) Down-Lock

The MLG down-lock is located on the jury brace; see Figure 3. As the landing gear is lowered and the side brace fully extends, a spring-loaded down-lock locks the gear in the down position. As the down-lock locks, a down-lock switch is actuated and a green light, for the corresponding gear, illuminates on the pilots' center instrument panel.

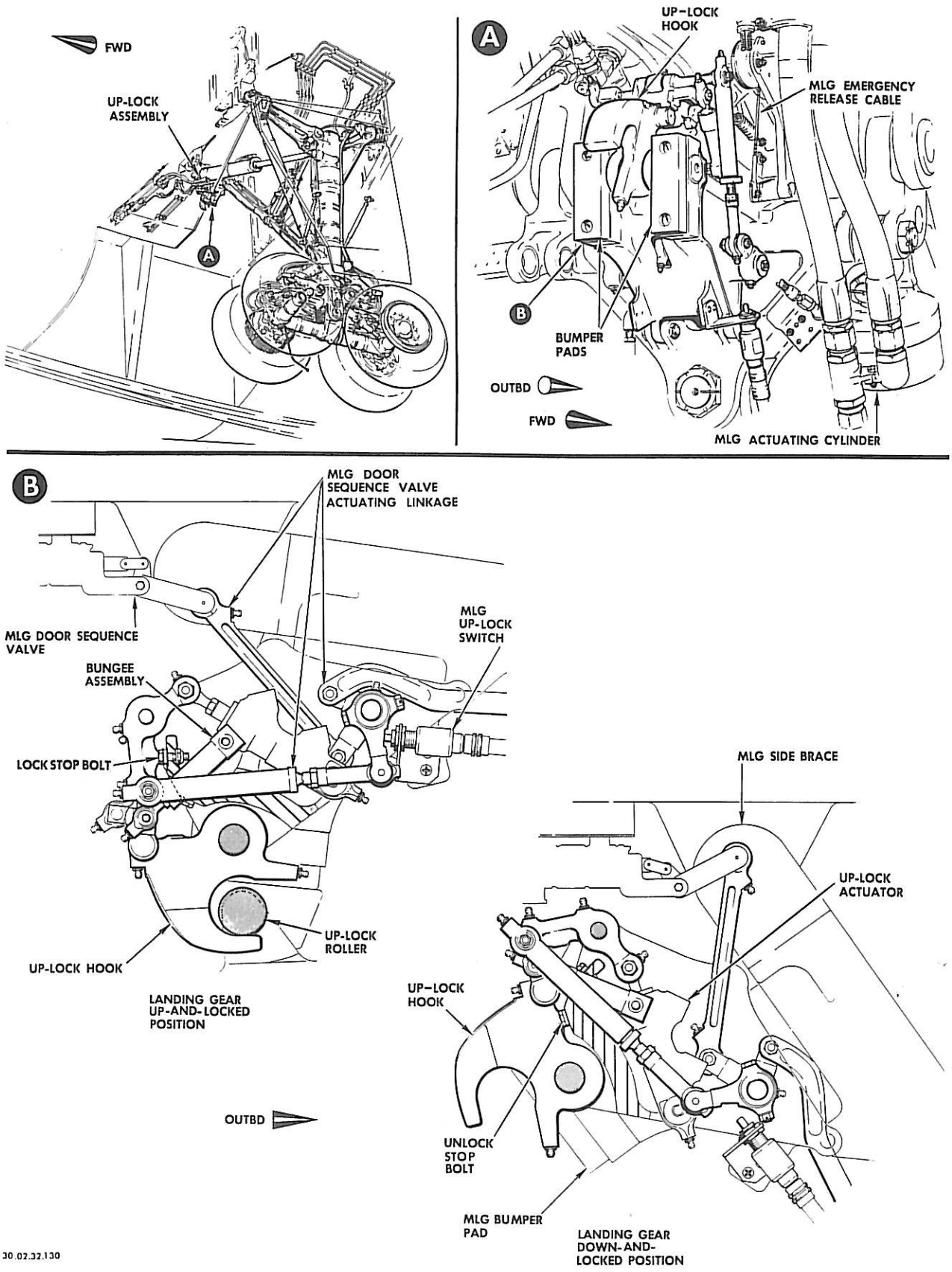
The MLG down-lock is also connected to the MLG door sequence valve through a series of rods, levers, and cranks. When the gear is lowered, movement of the down-lock actuates the MLG door sequence valve and closes the main landing gear doors. The gear down-lock also actuates the MLG door sequence valve to open the main landing gear doors during gear retraction cycle.

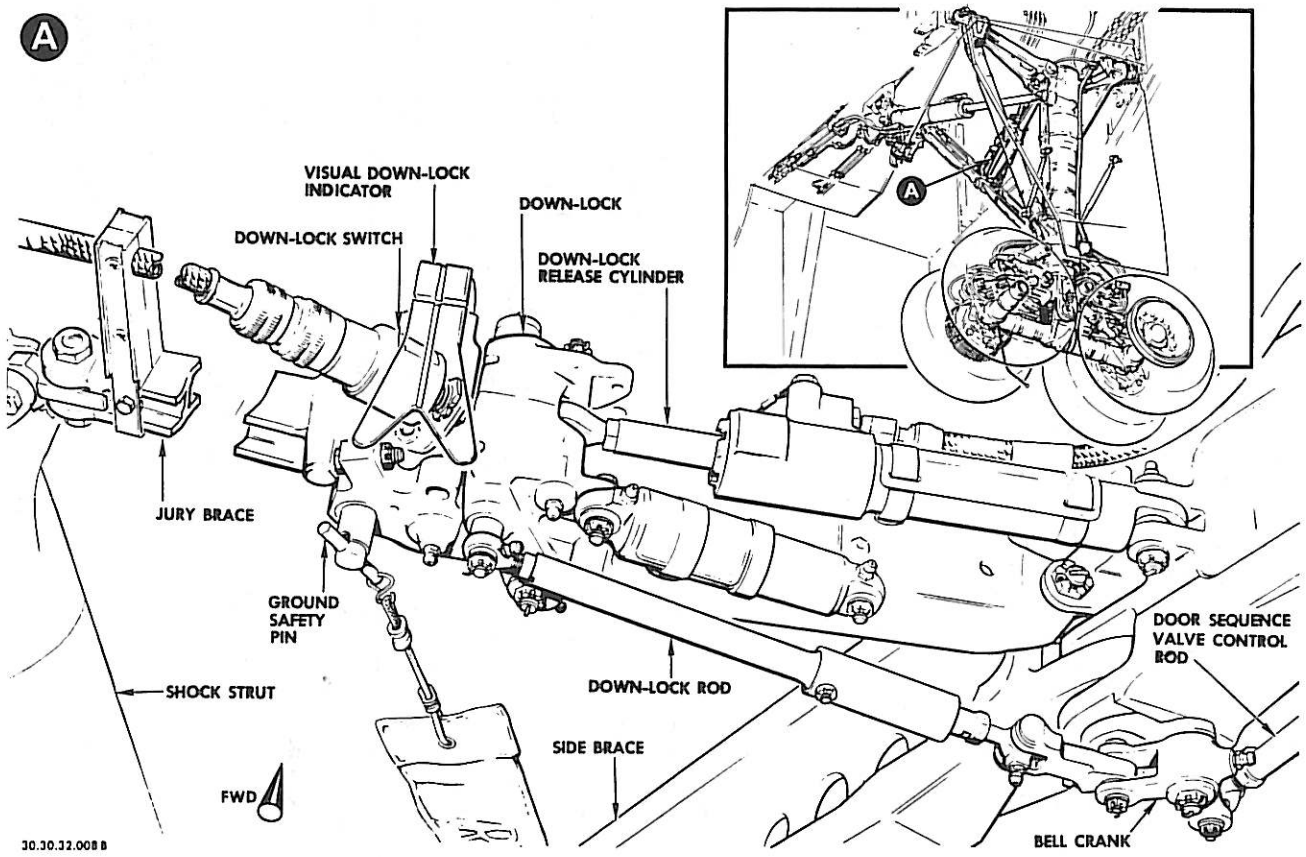
6. Main Landing Gear (MLG) Truck

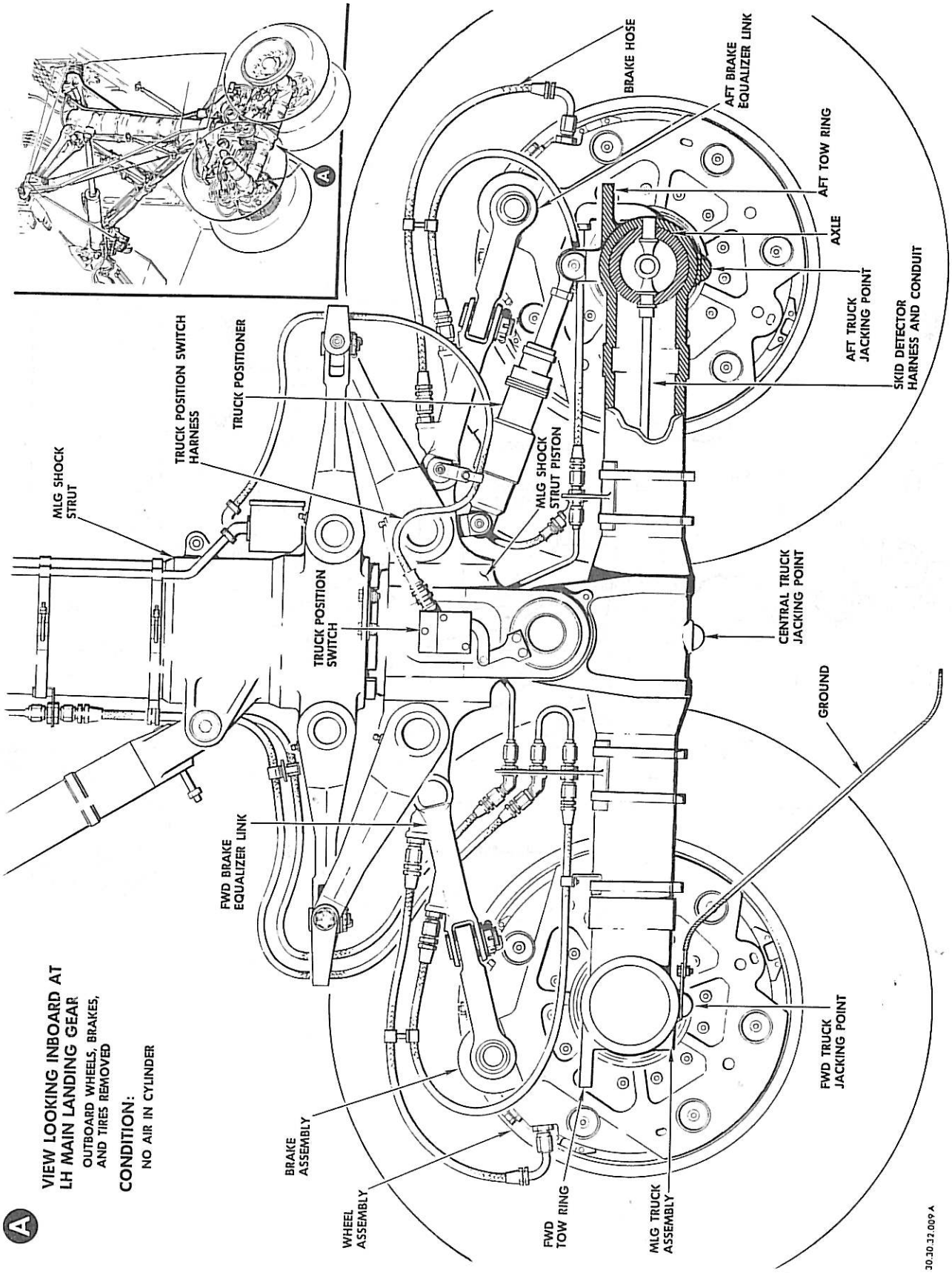
The MLG truck assembly is composed of an axle beam assembly (H frame and four wheel assemblies); see Figure 4. The axle beam assembly is attached through a center pivot to the lower end of the shock strut, and is free to rock up and down through an arc of 32 1/2 degrees. This freedom to "rock" compensates for various landing attitudes and ground irregularities, and permits all four wheels to remain in contact with the ground. The four wheel assemblies are mounted on the axle beam assembly in a dual-tandem arrangement.

Towing lugs are located on both the forward and aft ends of the axle beam assembly. There is also a jacking point on each end of the axle beam assembly and one in the center. This makes it possible to jack one pair of wheels at a time, or jack all four wheels at once.

A MLG truck positioner is mounted between the aft end of the axle beam assembly and the shock strut piston. The positioner holds the truck


FWD
UP-LOCK ASSEMBLY
A
UP-LOCK HOOK
MLG EMERGENCY RELEASE CABLE
B
BUMPER PADS
OUTBD
FWD
MLG ACTUATING CYLINDER
B
MLG DOOR SEQUENCE VALVE ACTUATING LINKAGE
MLG DOOR SEQUENCE VALVE
MLG UP-LOCK SWITCH
BUNGEE ASSEMBLY
LOCK STOP BOLT
UP-LOCK ROLLER
UP-LOCK HOOK
LANDING GEAR UP-AND-LOCKED POSITION
OUTBD
MLG SIDE BRACE
UP-LOCK ACTUATOR
UP-LOCK HOOK
UNLOCK STOP BOLT
MLG BUMPER PAD
LANDING GEAR DOWN-AND-LOCKED POSITION
30.02.32.130


A
VISUAL DOWN-LOCK INDICATOR
DOWN-LOCK
DOWN-LOCK SWITCH
DOWN-LOCK RELEASE CYLINDER
JURY BRACE
GROUND SAFETY PIN
DOOR SEQUENCE VALVE CONTROL ROD
SHOCK STRUT
DOWN-LOCK ROD
SIDE BRACE
FWD
BELL CRANK
30.30.32.008 B



Main Landing Gear Truck
Figure 4

assembly in the proper attitude for landing gear retraction (forward wheels 3.70 inches lower than aft wheels). Compressed air is used to provide the positioning force. Proper air pressure for the unit is indicated by a spring-loaded plunger type air gage located on top of the unit.

Skid detectors are mounted in the end of each axle. The detectors fit inside the hollow axles, and the connecting wires are routed through drilled passages and conduit to the rear of the shock strut.

7. Main Landing Gear (MLG) Wheels and Tires

Each of the eight main landing gear wheel assemblies consists of a split-type wheel and a 41 x 15-18 TYPE VIII, *22, or **24, ply rating tubeless tire. The hub cap has a fitting for driving a skid detector mounted in the hollow axle. Each wheel assembly rotates on two roller bearings and can be mounted in any of the eight wheel positions.

The split-type wheel can be separated for mounting and dismounting tires. The tire air filler connection is attached to the outer section of the wheel. Fuse bolts are located at four places in the wheel. Each fuse bolt contains a metal alloy core which will melt and relieve tire pressure if excessive braking overheats the wheel assembly. The fuse bolts reduce the possibility of injury to service personnel from a tire blowout.

*Applicable to airplanes CV1, CV2, and CV5 through CV24.
**Applicable to airplanes CV3, CV4, and CV25 and on.

MAIN LANDING GEAR (MLG) - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. MAIN LANDING GEAR FAILS TO RETRACT OR EXTEND	
A. Insufficient hydraulic pressure.	Check No. 2 system hydraulic pressure gage. If no pressure is indicated, refer to Chapter 29, HYDRAULIC POWER.
B. Main landing gear selector valve rigged improperly.	Check rigging of selector valve and adjust if necessary. Refer to 32-5-0 for adjustment procedures.
C. Main landing gear selector valve defective or malfunctioning.	Check hydraulic pressure between the selector valve and the landing gear sequence valve. Remove and replace selector valve if no pressure is indicated and valve if rigged correctly.
D. Refer to 32-2-0 (Main Landing Gear Hydraulic System - Trouble Shooting) for other causes and corrective procedures.	
2. MAIN LANDING GEAR BINDS WHEN EXTENDING OR RETRACTING	
A. Forward trunnion retaining nut loose.	Check that lockbolt on the forward trunnion pin is installed. If forward trunnion pin retaining nut is loose, gear may slide back giving incorrect clearance reading at aft trunnion.
B. Insufficient clearance at aft trunnion bushings.	Check clearance at aft trunnion bushing and remove shims if necessary.
C. Damaged or bent braces or trunnion.	Check linkage and gear for freedom of movement and damage. Remove and replace all damaged or binding mechanish.
3. EXCESSIVE FORCE REQUIRED TO OPERATE LANDING GEAR CONTROL LEVER	
A. Binding or damaged pulleys.	Check condition of pulleys and freedom of movement. Remove and replace if damaged or binding.
B. Excess cable tension.	Check cable tension and adjust if necessary.
C. Damaged or frayed cables.	Check condition of all cables and replace all damaged or frayed cables.

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
4. LANDING GEAR CONTROL LEVER WILL NOT MOVE FROM DOWN POSITION WITH AIRCRAFT ON JACKS	
A. Landing gear control lever ground safety pin solenoid malfunctioning.	Check for electrical power to solenoid. If electrical power is not available, determine reason. Check safety pin for freedom of movement and damage. Remove and replace if damaged or binding.

MAIN LANDING GEAR (MLG) - MAINTENANCE PRACTICES

1. Servicing Main Landing Gear (refer to Chapter 12, SERVICING)

2. Adjustment/Test Main Landing Gear (see Figure 201)

   A. Scope of work involved.

      (1) This procedure checks the following main landing gear components:

         (a) Shock strut trunnion.

         (b) Side brace pivot shaft.

         (c) Jury brace down-lock.

         (d) MLG actuating cylinder.

         (e) Position and warning switches.

         (f) MLG door sequence valve.

         (g) MLG up-lock and bumpers.

      (2) Prior to conducting this procedure the landing gear normal and emergency controls, and the MLG door mechanisms must be properly rigged (refer to 32-5-0, 32-6-0 and 32-13-0).

   B. Equipment Required.

      (1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering 3000 psig at 16 gpm.

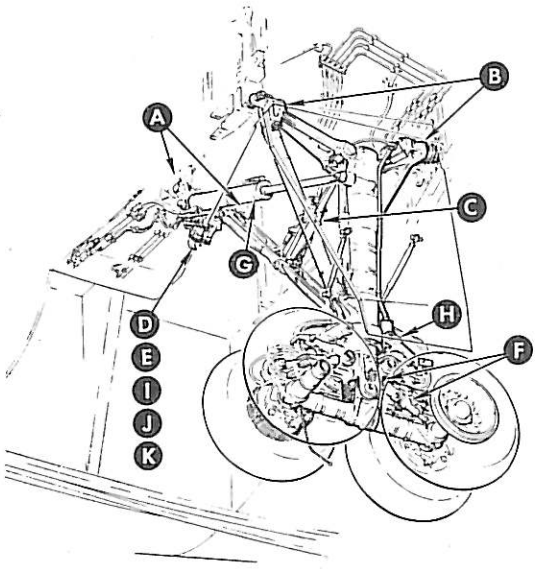
         NOTE: The hydraulic test unit shall have a metering device to limit MLG extension and retraction time to 15 seconds minimum.

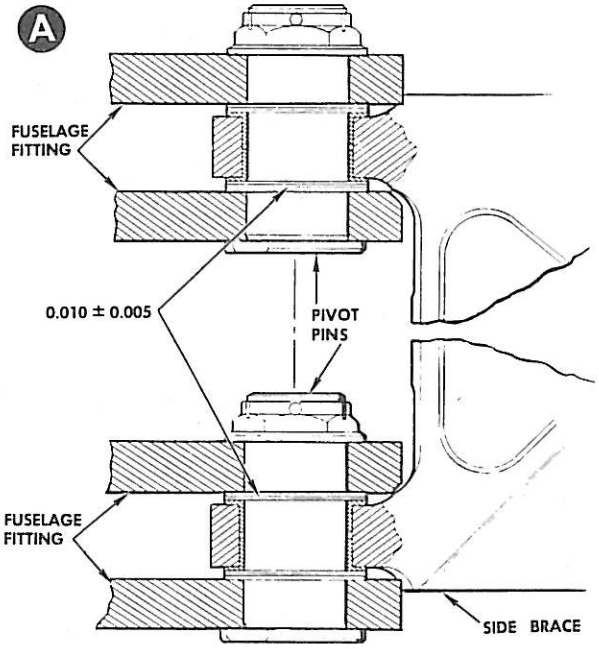
      (2) Airplane jacking equipment.

      (3) Guard rails to keep personnel out of wheel well areas.

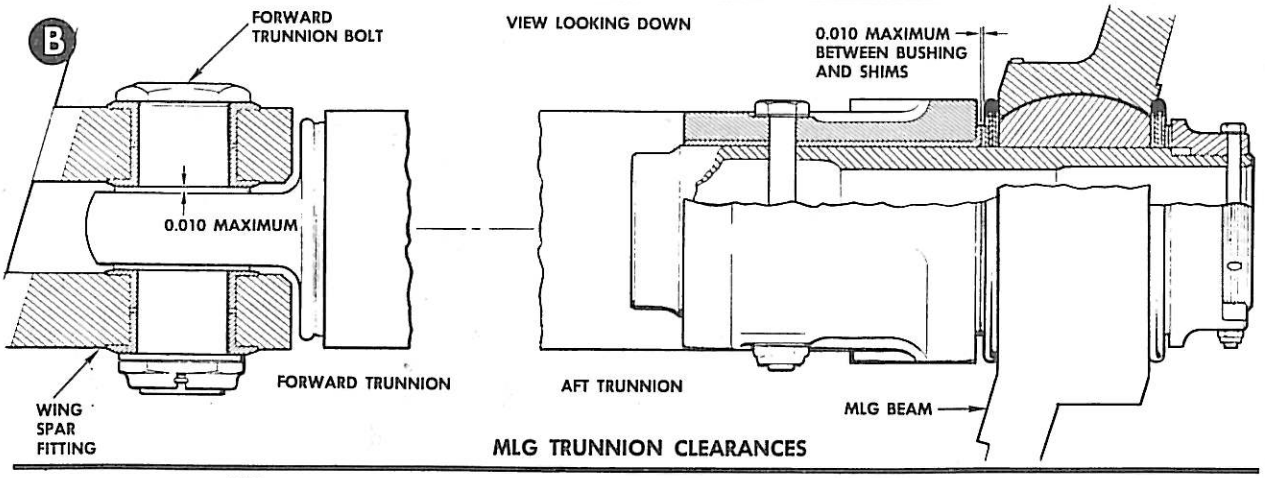
      (4) Suitable safety device to support MLG during retracted position checks and/or adjustments.

      (5) Rigging tool RGTL 30-82017-1, or equivalent, to rig MLG door sequence valve.

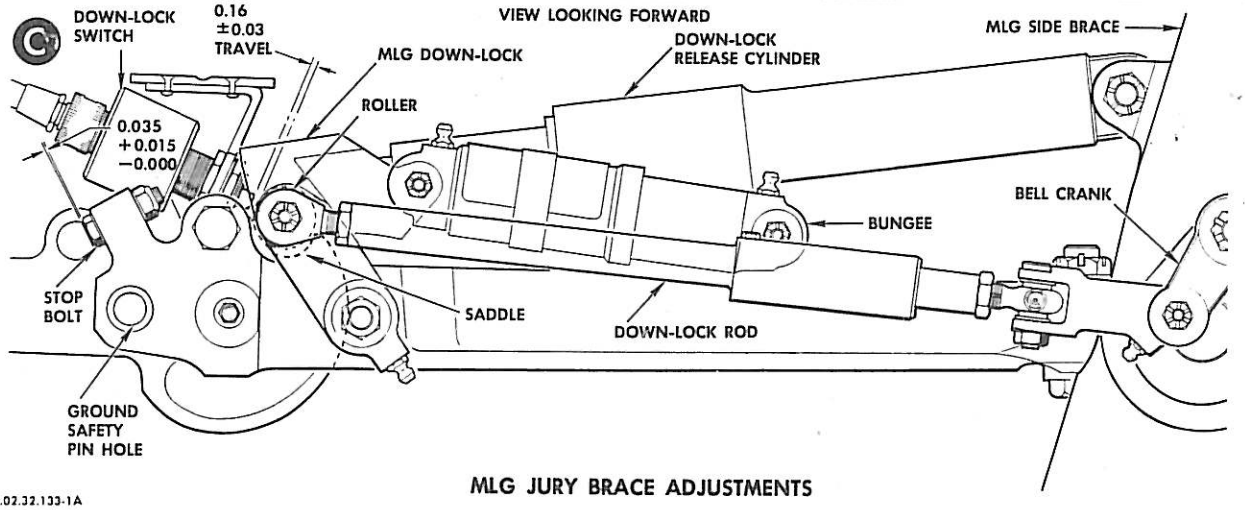




MLG UPPER SIDE BRACE CLEARANCE



MLG TRUNNION CLEARANCES



MLG JURY BRACE ADJUSTMENTS

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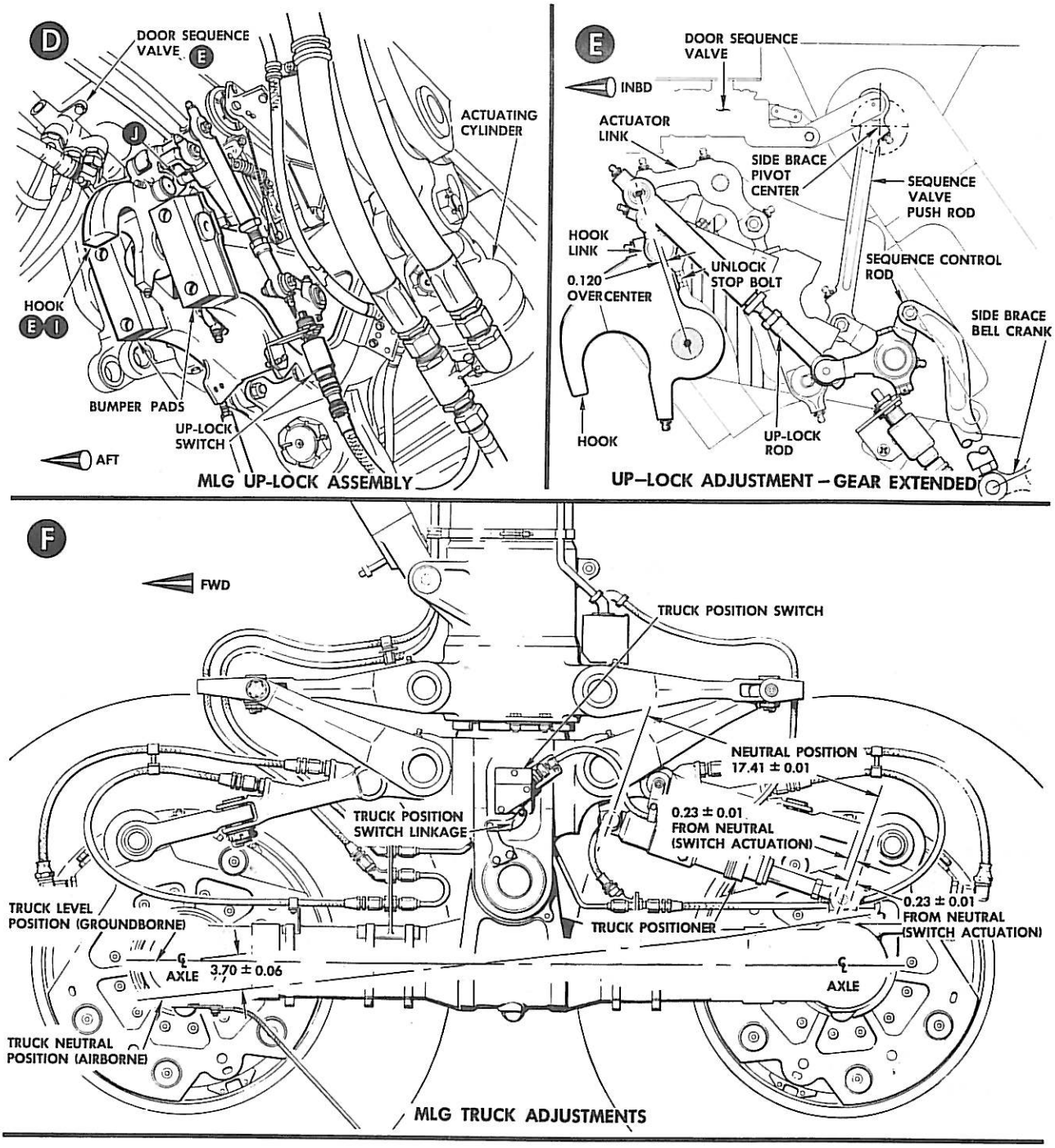

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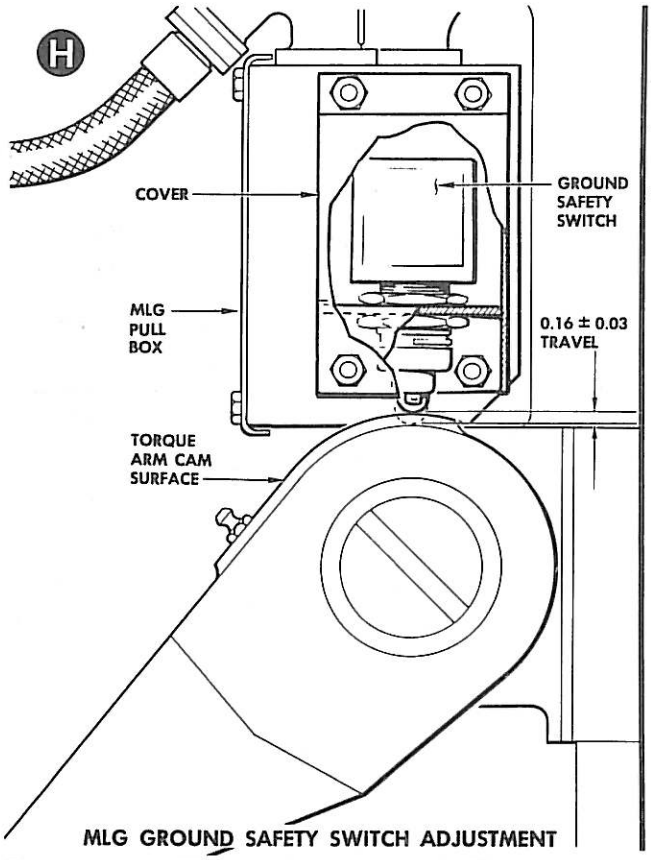
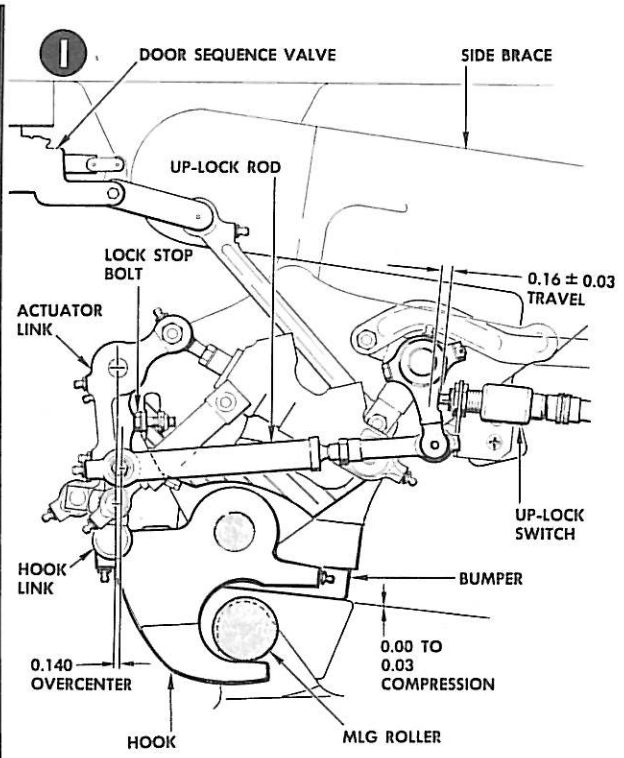
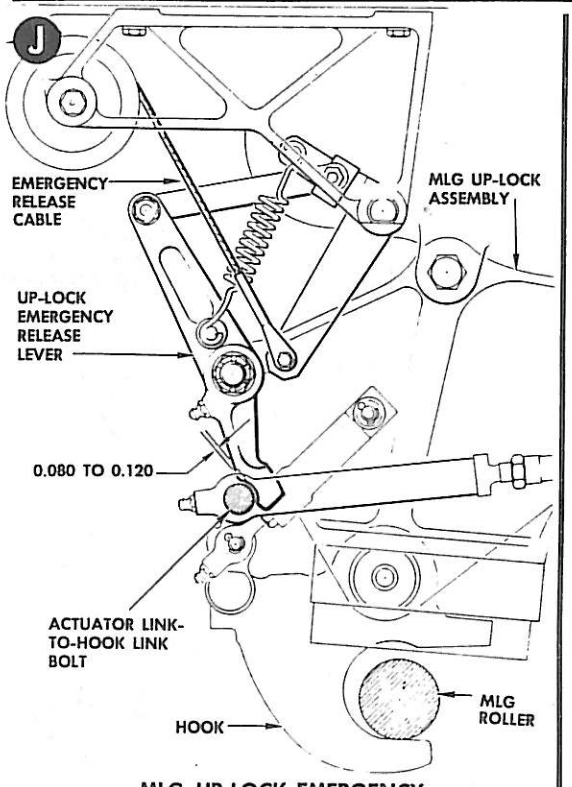


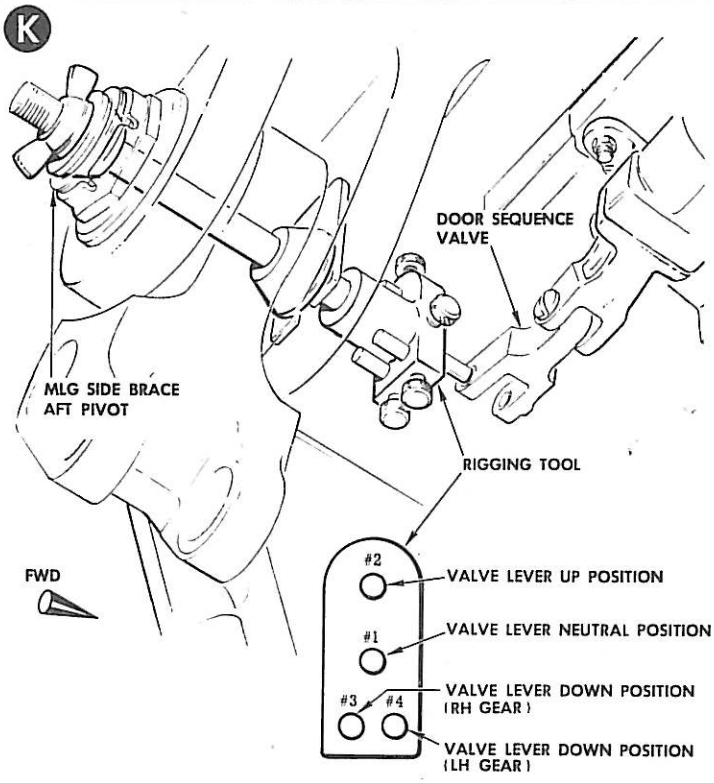
MLG GROUND SAFETY SWITCH ADJUSTMENT



MLG UP-LOCK AND ADJUSTMENTS - GEAR RETRACTED



MLG UP-LOCK EMERGENCY RELEASE LEVER CLEARANCE



MLG DOOR SEQUENCE VALVE RIGGING TOOL

30.02.32.133-3A

C. Preparation.

(1) Check that truck positioners are properly serviced (refer to Chapter 12, SERVICING).

CAUTION: DO NOT PROCEED WITH TEST UNTIL TRUCK POSITIONERS ARE PROPERLY SERVICED.

(2) Jack airplane until landing gear wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING). Gear shall have ground safety pins installed.

(3) Disconnect fairing links and tie fairing back out of path of gear (refer to 32-13-2).

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks and manually open doors. Disconnect MLG door links at door mechanism cranks (refer to 32-13-5) and return ground access handle to normal (forward) position.

(5) Place guard rails around wheel well areas.

(6) Connect hydraulic test unit to No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER). Do not apply hydraulic pressure.

D. Procedure.

WARNING: DURING MLG CHECKS OR ADJUSTMENTS WITH THE MLG RETRACTED, THE MLG SHALL BE BRACED WITH A SUITABLE SAFETY DEVICE TO PREVENT ACCIDENTAL GEAR EXTENSION AND POSSIBLE INJURY TO PERSONNEL.

Figure Detail

(1) With the airplane on jacks and the main landing gear in the down position, check the upper side brace and shock strut trunnions for the following clearances.

(a) Side brace upper pivot pins shall have 0.010 (±0.005)-inch clearance between support bushings and shims. — A

NOTE: Check clearance with the side brace butted against faces of fuselage fittings.

(b) Shock strut forward trunnion shall have 0.010-inch maximum clearance between wing spar fitting and trunnion fitting. — B

(c) Shock strut aft trunnion shall have 0.010-inch maximum clearance between face of aft trunnion bushing and forward face of shim stack. — B

	Figure Detail
(2) Check MLG jury brace stop bolt adjustment as follows:	
(a) Bottom down-lock roller against jury brace saddle by pushing knee of jury brace upward.	C
(b) Clearance between head of stop bolts and flats on jury brace shall be 0.035 (+0.015, -0.000) inch.	C
(c) Adjust stop bolt shims as required to obtain clearance within preceding tolerance and to permit easy installation and removal of ground safety pin.	
(3) Check MLG up-lock unlocked position. With the up-lock hook bottomed against the unlock stop bolt, the hook link-to-hook bolt shall be overcenter 0.120 inch (measured from reference line between actuator link-to-hook link bolt and hook pivot bolt). Add or remove shim washers on unlock stop bolt to obtain correct overcenter dimension.	D,E
(4) Check MLG down-lock switch for correct adjustment. Switch plunger shall be depressed 0.16 (±0.03) inch when gear is down and locked.	C
(5) Check truck positioner and position switch adjustment as follows:	
(a) With the MLG truck in the neutral position, the distance between centers of the truck positioner attachment bolts shall be 17.41 (±0.01) inches. Adjust rod end of truck positioner to obtain correct dimension; tighten rod end jam nut and safety-wire.	F
(b) Remove truck position switch cover (refer to 32-10-1) and set switch arm eccentric bolt in middle of adjustment range.	F
(c) Loosen nut on position switch shaft until flush with end of shaft.	
(d) Using the serrations on position switch shaft, set switch arm as close as possible to the middle of the switch deadband. Tighten shaft nut and then back off 1/4 turn.	

Figure Detail

(e) Slowly raise aft wheels. The truck position switch shall actuate when truck positioner has been compressed 0.23 (±0.01) inch from neutral position (when centerline of aft axle has traveled upward 0.90 (±0.10) inch from neutral position). — F

CAUTION: DO NOT EXCEED TRUCK JACKING LIMITS SPECIFIED IN CHAPTER 7, LIFTING AND SHORING.

(f) Return truck to neutral position.

(g) Slowly raise forward wheels. The truck position switch shall actuate when truck positioner has been extended 0.23 (±0.01) inch (when centerline of forward axle has traveled upward 0.90 (±0.10) inch from neutral position). — F

(h) Adjust switch arm eccentric bolt as necessary to obtain proper travel, and repeat steps (e) through (g). Torque nut on eccentric bolt 12 to 15 inch-pounds, and nut on switch shaft 20 to 25 inch-pounds.

(i) Install truck position switch cover (refer to 32-10-1).

(6) Check the MLG ground safety switch adjustment. Switch shall actuate to groundborne position when strut is compressed 1.25 (±0.25) inches from fully extended position. Total switch plunger travel shall be 0.16 (±0.03) inch when shock strut is anywhere between fully compressed and 1.50 inches from fully extended position. Remove MLG ground safety switch cover (refer to 32-11-1) and adjust switch as necessary. — H

(7) Check MLG door sequence valve rigging as follows:

NOTE: All door sequence valve adjustments are accomplished with gear down.

(a) Install rigging tool RGTL 30-82017-1 at upper side brace pivot point, adjacent to the MLG door sequence valve to be adjusted. — K

(b) Disconnect door sequence valve push rod from valve lever and allow valve to move to neutral position. — E

Figure Detail

(c) Check door sequence valve for proper location.

1) With door sequence valve in neutral position, rigging tool pin # 1 shall insert easily into valve lever bolt hole. — E,K

NOTE: The MLG door sequence valve lever is free of spring load for slight movement up and down at neutral. Valve location is satisfactory if rigging tool pin # 1 can be inserted easily within unsprung range of valve lever movement.

2) If door sequence valve does not meet requirement in step 1) preceding, shim between valve and mounting bracket to obtain proper alignment.

(d) Check sequence control rod for proper length.

1) Disconnect down-lock rod at down-lock on MLG jury brace. — C

2) Temporarily connect push rod to MLG door sequence valve lever; insert bolt from side opposite to rigging tool. Retract bolt far enough to allow rigging tool pin # 1 to be inserted into valve lever approximately 1/8 inch; insert rigging tool pin # 1. — E,K

3) Adjust length of sequence control rod to position centerline of bolt attaching down-lock rod to bell crank on MLG side brace pivot pin within ±0.05 inch of pivot pin centerline; set jam nuts and safety-wire. — C,E

(e) Check down-lock rod adjustment.

1) Retract rigging tool pin # 1 from door sequence valve lever; leave lever-to-push rod bolt partially retracted.

2) Temporarily connect down-lock rod to down-lock on MLG jury brace.

3) With the MLG up-lock open, adjust length of down-lock rod as required to allow rigging tool pin # 2 to be inserted freely into door sequence valve lever bolt hole; set jam nuts and safety-wire. — E,K

	Figure Detail
(f) Check up-lock rod adjustment.	
1) Disconnect down-lock rod at down-lock on MLG jury brace.	C
2) Disconnect MLG up-lock emergency release lever from adjacent lever to allow up-lock to be closed.	J
3) Manually close MLG up-lock.	I
NOTE: The up-lock actuator link must be against lock stop bolt.	
4) Adjust length of up-lock rod as required to allow rigging tool pin #3 (right-hand MLG door sequence valve adjustment) or pin #4 (for left-hand MLG door sequence valve adjustment) to be inserted freely into valve lever bolt hole; set jam nut and safety-wire.	I,K
5) Open MLG up-lock and reconnect emergency release lever to adjacent lever.	J
(g) Remove MLG door sequence valve rigging tool.	
(h) Connect push rod to door sequence valve lever, using a washer at each side of push rod bearing to eliminate sideplay, and secure nut with cotter pin (refer to 32-2-3).	
NOTE: Do not secure push rod connection at this time if MLG actuating cylinder overtravel is to be checked.	
(i) Connect down-lock rod to down-lock on MLG jury brace; secure nut with cotter pin.	
(j) Check up-lock rod lost motion.	
1) The up-lock rod must not be completely bottomed; clearance (lost motion) shall be 0.005 inch minimum.	
2) If minimum clearance is not met in step 1) preceding, adjust up-lock rod to obtain minimum clearance. Back off adjustment to nearest lock point (increased clearance) and secure adjustment.	
(8) Check MLG actuating cylinder extended position overtravel as follows:	
(a) With hydraulic pressure reduced to 0 psig (refer to Chapter 12, SERVICING), disconnect actuating cylinder rod end from shock strut (refer to 32-2-4).	
(b) Disconnect push rod from MLG door sequence valve (refer to 32-2-3).	

Figure Detail

(c) With the MLG door mechanism in the door open position and the ground access handle in normal (forward) position, apply reduced hydraulic pressure (250 to 500 psig) to the No. 2 hydraulic system and extend actuating cylinder piston.

NOTE: Landing gear control lever must be in the DOWN position.

(d) Rod end shall have 0.30 (±0.03) inch overtravel. G

NOTE: Check that distance between centerline of rod end bearing and end of piston rod does not exceed four inches.

(e) Temporarily connect actuating cylinder rod end to shock strut.

(f) Secure push rod to MLG door sequence valve per step (7)(h), preceding.

(9) Remove landing gear ground safety pins.

(10) Check MLG actuating cylinder retracted position over-travel as follows:

(a) Retract gear slowly using the auxiliary hydraulic pump only (refer to Chapter 29, HYDRAULIC POWER). MLG must lock in the up position and sequence the door mechanism to close doors.

(b) If requirements of step (a) preceding are not met, reduce MLG actuating cylinder extended position overtravel within limits of step (8)(d), preceding, until MLG locks up and sequences door mechamisms to close doors.

(c) Return gear to the down position.

(d) Torque MLG actuating cylinder rod end jam nut to 125 (±5) foot-pounds and safety-wire to retainer washer.

(e) Secure actuating cylinder rod end attachment at shock strut (refer to 32-2-4).

(11) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER) and slowly raise MLG to the up-and-locked position.

(a) Check clearance with surrounding structure and equipment as MLG retracts.

(b) All rotating joints in MLG side brace, jury brace, and shock strut shall rotate freely during retraction.

Figure Detail

(c) Adjust upper side brace shimming to align upper side brace (forward and aft) for 0.10 inch up-lock hook-to-strut side clearance when MLG is retracted.

(12) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(13) Check MLG up-lock locked position.

(a) With actuator link bottomed against lock stop bolt, hook link-to-actuator link bolt shall be overcenter 0.140-inch (measured from reference line between actuator link pivot bolt and hook link-to-hook bolt). Add or remove shim washers on lock stop bolt to obtain correct overcenter dimension. — I

(b) Shim up-lock bumpers as required to obtain 0.00- to 0.03-inch compression of bumpers. — I

(14) With gear up and locked, check up-lock emergency release lever adjustment. Clearance between release lever and actuator link-to-hook link bolt shall be 0.080- to 0.120-inch. (Refer to 32-6-0, step 1.C.(10) if adjustment is required.) — J

(15) Check MLG up-lock switch adjustment. Switch plunger shall be depressed 0.16 (±0.03) inch when gear is up and locked. — I

(16) Extend landing gear to the down-and-locked position and install ground safety pins.

(17) Adjust and connect fairing links to main landing gear (refer to 32-13-2, steps 2.B(3) and 2.C.(6) thru 2.C.(13)).

(18) Reconnect door links to door cranks (refer to 32-13-0, step 1.C.(7), and 32-13-5).

(19) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

MAIN LANDING GEAR SHOCK STRUT - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. SHOCK STRUT FAILS TO HOLD PRESSURE	
A. Hydraulic fluid leak at strut gland area.	Depressurize strut and check for deteriorated "O" ring seals. Replace with spare seals mounted in the bearing assembly at lower end of cylinder; refer to 32-1-1. If scratched or pitted surface on strut piston is ruining the "O" ring seals, polish the damaged area on the piston with crocus cloth. If the surface of the piston is severely damaged (pitted or scratched through the chrome plating) replace strut piston; refer to 32-1-1.
B. Air leak at strut air valve.	Depressurize strut and check for deteriorated "O" ring packing. Replace "O" ring if necessary. WARNING: DO NOT LOOSEN OR REMOVE THE VALVE BODY UNTIL ALL PRESSURE IS RELEASED. THIS PART COULD BE BLOWN OUT AND CAUSE SERIOUS INJURY OR FATALITY TO PERSONNEL. Check for loose valve body or hex swivel nut. Torque valve body 100 to 110 inch-pounds. Torque hex swivel nut 50 to 70 inch-pounds. Check for corrosion or foreign matter on seat of stem or body. Restore valve seat or replace air valve.

MAIN LANDING GEAR (MLG) SHOCK STRUT - MAINTENANCE PRACTICES

1. Servicing MLG Shock Strut (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Shock Strut (see Figure 201)

   A. Equipment Required.

      (1) Airplane jacking equipment.

      (2) MLG strut restraining clamps.

      (3) Suitable MLG support dolly.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      ANTI-SKID MAIN POWER, CONT, and WARN.

      WARN HORN.

      LANDING GEAR POS & WARN.

      LANDING GEAR HANDLE SOLENOID.

      CABIN PRESSURE REGULATOR FWD and AFT.

      (3) Check that landing gear ground safety pins are installed.

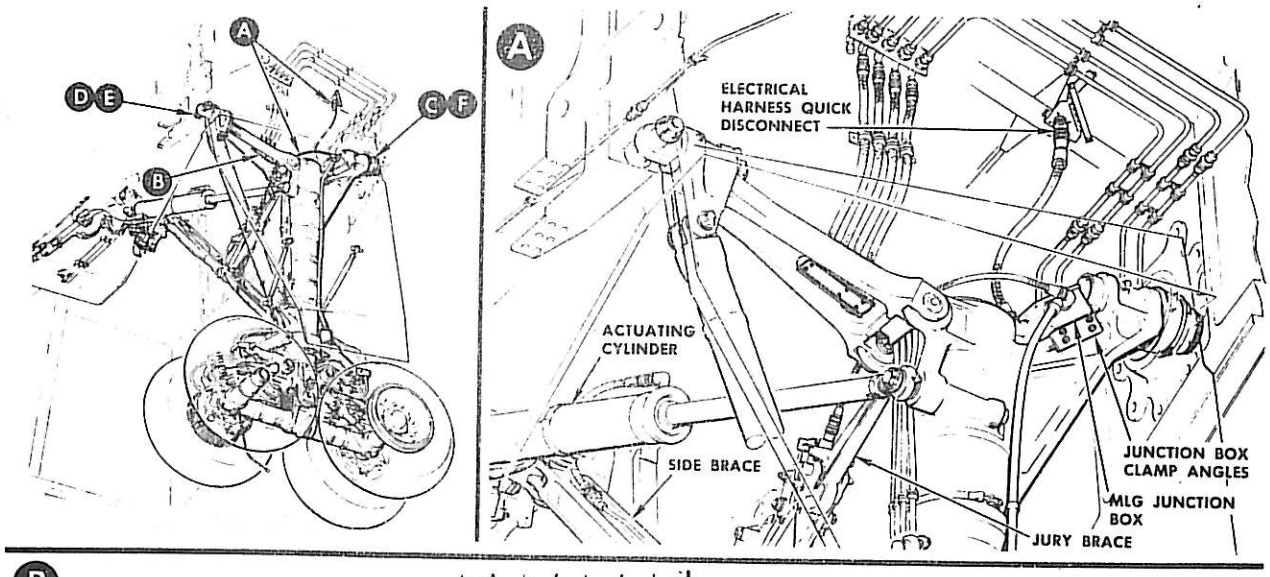
      (4) Jack airplane as necessary to permit safe removal of shock strut (refer to Chapter 7, LIFTING AND SHORING).

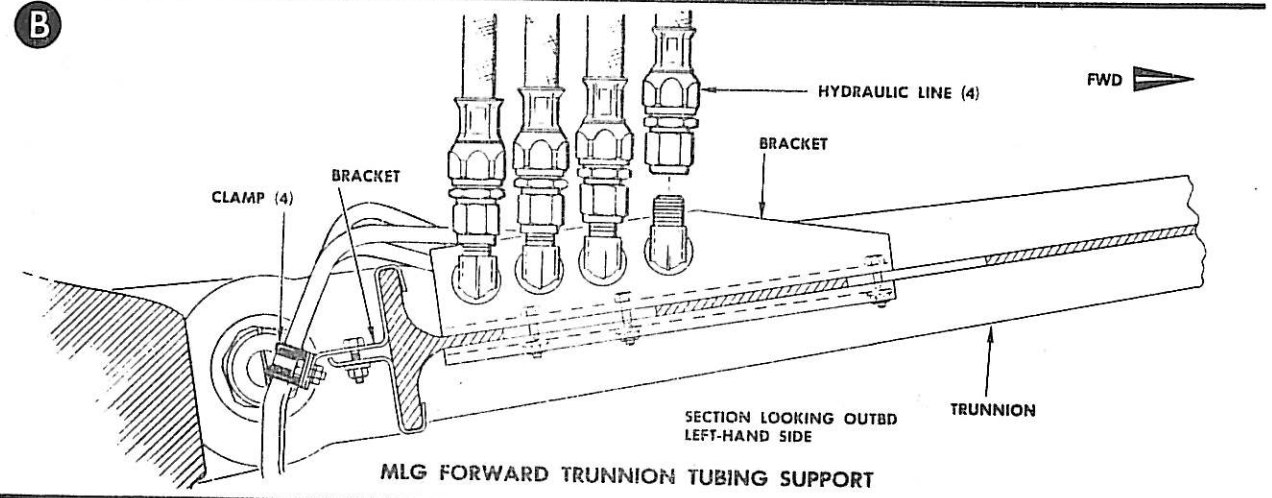
      (5) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

   C. Remove MLG Shock Strut.

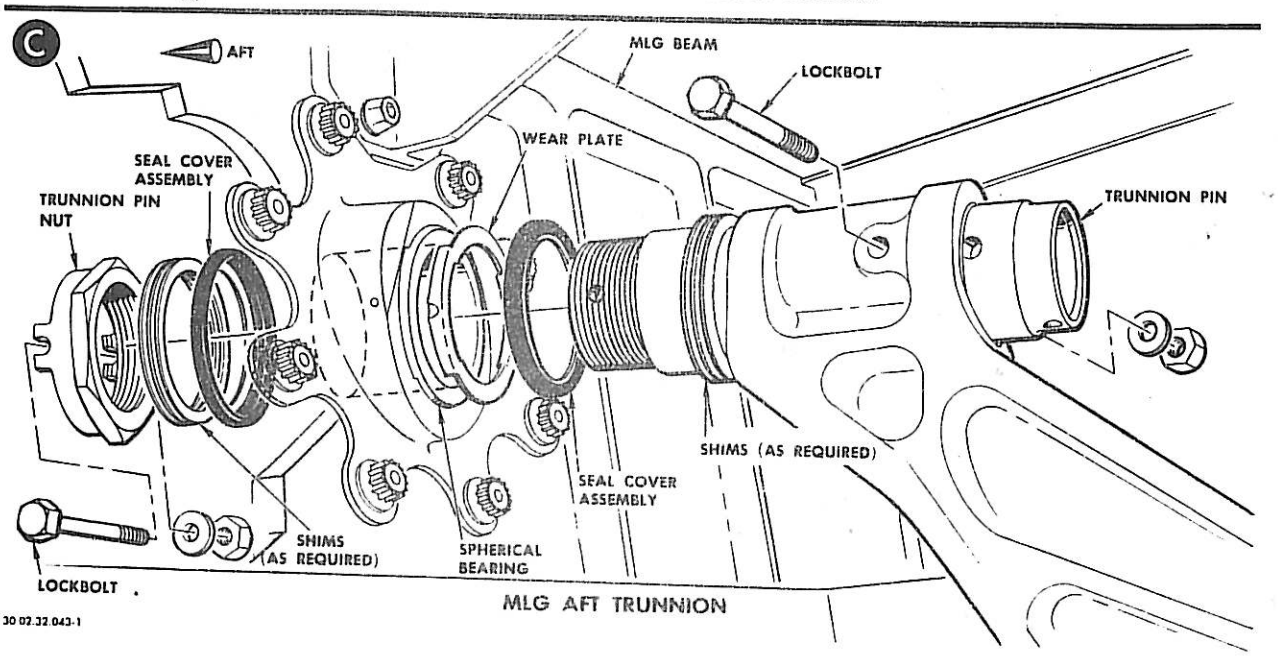
      (1) Relieve air pressure in MLG shock strut and truck positioner (refer to Chapter 12, SERVICING).

      (2) Position suitable dolly under MLG wheels to take load off shock strut trunnions. Install strut restraining clamps to hold shock strut compressed.



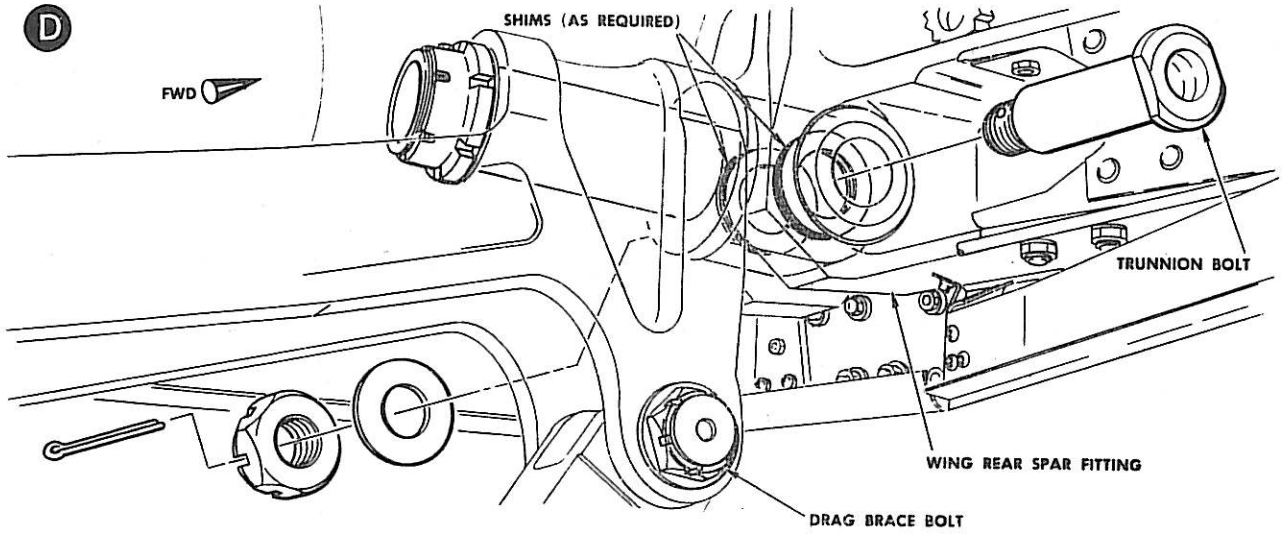


MLG FORWARD TRUNNION TUBING SUPPORT

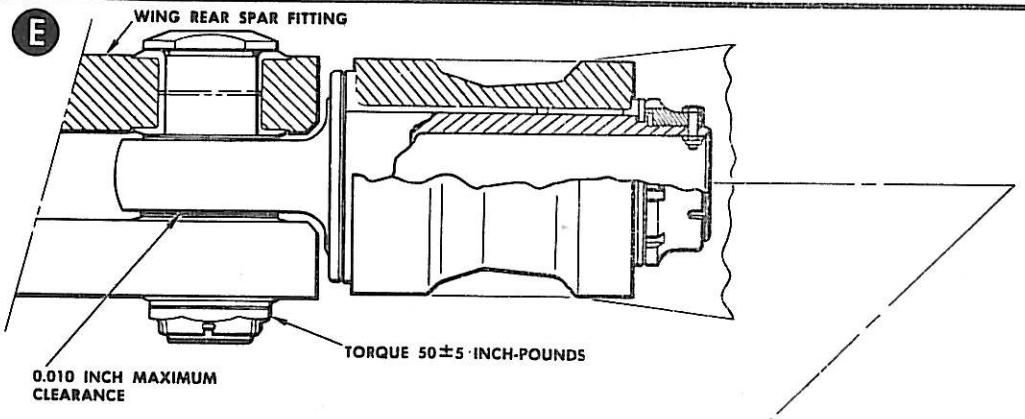


MLG AFT TRUNNION

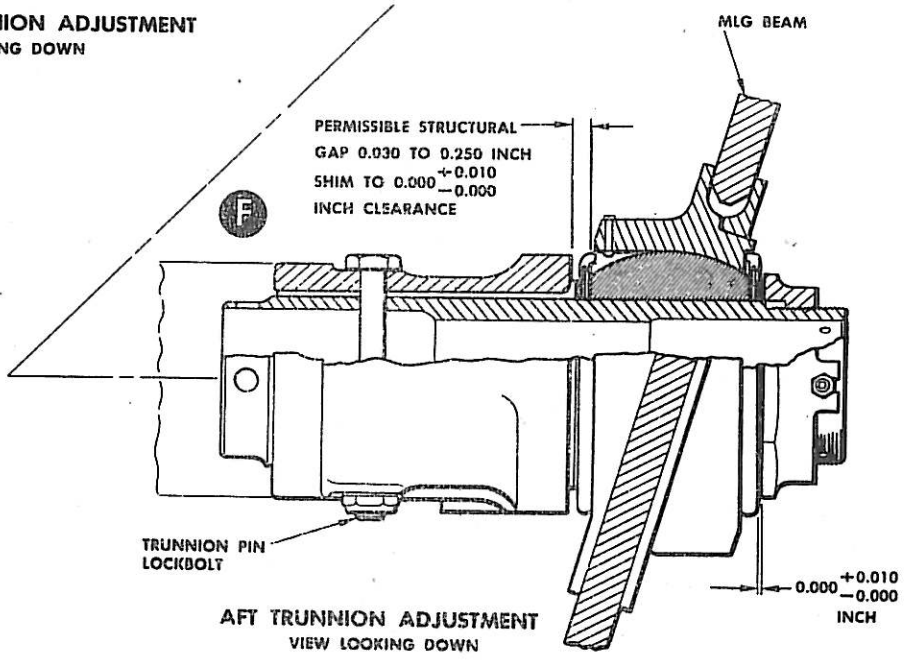
30 02.32.043-1



MLG FORWARD TRUNNION



FORWARD TRUNNION ADJUSTMENT
VIEW LOOKING DOWN



AFT TRUNNION ADJUSTMENT
VIEW LOOKING DOWN

30.02.32.043-2

	Figure Detail
(3) Disconnect fairing links from MLG shock strut and tie fairing clear of strut (refer to 32-13-2).	
(4) Disconnect MLG electrical harness at quick disconnect at top of main wheel well, above MLG junction box.	A
(5) Remove clamp securing electrical harness to MLG jury brace and disconnect harness from down-lock switch (refer to 32-10-2).	
(6) Remove MLG junction box cover and disconnect skid detector, ground safety switch, and truck position switch harnesses at terminals in junction box. Disconnect shock strut harness conduit from junction box.	A
(7) Remove four bolts, washers, and nuts clamping junction box to MLG aft trunnion; remove junction box and clamp angles.	A
(8) Disconnect four hydraulic lines (flexible hoses) at support bracket on upper side of MLG forward trunnion. Remove eight bolts, washers, and nuts securing tubing support brackets to MLG forward trunnion.	A,B
(9) Disconnect MLG actuating cylinder rod end from shock strut (refer to 32-2-4). Support disconnected actuating cylinder to avoid possible damage to unit.	
(10) Disassemble MLG jury brace attachment to upper end of shock strut (refer to 32-1-3).	
(11) Disassemble MLG side brace attachment to shock strut (refer to 32-1-2). Support disconnected side brace to avoid possible damage to unit.	
(12) Remove aft trunnion pin and nut lockbolts; remove aft trunnion pin nut, shims, and seal cover assembly. Withdraw trunnion pin through trunnion beam enough to clear spherical bearing and remove shims, seal cover assembly and wear plate between trunnion beam and spherical bearing.	C
NOTE: Record thickness of shims used at forward side of the spherical bearing to facilitate shock strut installation.	
(13) Disassemble drag brace from MLG forward trunnion by removing cotter pin, nut, washer, bolt, and spacer. Support disconnected end of drag brace.	D

	Figure Detail
(14) Remove cotter pin, nut, and washers from bolt securing forward trunnion to wing rear spar; remove bolt and shims.	D
(15) Using MLG support dolly, lower MLG and move landing gear clear of airplane.	
D. Install MLG Shock Strut.	
(1) Remove nut, washer, bolt, and shims (if installed) which secure forward trunnion beam to wing rear spar.	D
(2) Disassemble drag brace assembly (if assembled) from forward trunnion.	D
(3) Remove lockbolt that secures aft trunnion pin (if installed) and withdraw trunnion pin into trunnion beam with component parts removed.	C
(4) Move MLG on support dolly (strut restraining clamps installed) into correct position for installation.	
(5) Raise MLG until forward and aft trunnions align with airplane fittings.	C,D
(6) Align forward trunnion with wing fitting and install shims, bolt, washer, and nut. Torque nut 50 (±5) inch-pounds and secure with cotter pin.	D,E
NOTE: For cotter pin alignment, back off nut to first castellation. The forward trunnion bolt shall have a maximum of 0.010-inch clearance between laminated shims and face of spar fitting bushing. Add or remove shim laminations until clearance is within tolerance.	
(7) Connect drag brace to forward trunnion.	D
(8) Place wear plate, aft trunnion forward seal cover assembly, and shim stack (preliminary shim thickness determined in step 2.C.(12) of removal procedure) between aft trunnion beam and spherical bearing.	C
(a) Permissible structural gap between face of trunnion bushing and seal cover assembly is 0.030- to 0.250-inch. Shim to 0.000 (+0.010, -0.000)-inch clearance.	F
NOTE: If additional shimming is required, use shims from the aft seal cover assembly shim stack (step (9) following).	

	Figure Detail
(b) Insert trunnion pin through forward shim stack, seal cover assembly, wear plate, and spherical bearing.	C,F
(c) Secure trunnion pin with lockbolt, washer, and nut.	C,F
(9) Install the aft trunnion aft seal cover assembly, shim stack, and nut.	C
NOTE: At least one 0.030-inch shim must be used under trunnion pin nut.	
(a) Clearance between shim stack and nut shall be 0.000 (+0.010, -0.000)-inch.	F
(b) Secure trunnion pin nut with lockbolt, washer, and nut.	C,F
(10) Connect lower end of side brace to shock strut (refer to 32-1-2).	
CAUTION: THE SIDE BRACE-TO-SHOCK STRUT ATTACHMENT MUST BE A SLIP-FIT; ANY EXTREME MISALIGNMENT WILL CAUSE BINDING WHEN GEAR IS RETRACTED. ADJUST SHIMS AT THE SIDE BRACE UPPER PIVOT PINS TO OBTAIN PROPER ALIGNMENT.	
(11) Connect MLG jury brace to shock strut (refer to 32-1-3).	
(12) Connect MLG actuating cylinder to shock strut (refer to 32-2-4).	
(13) Position MLG junction box on upper side of MLG aft trunnion and secure to trunnion with clamp angles, bolts, washers, and nuts.	A
(14) Connect shock strut harness conduit to MLG junction box and connect correct wires together at terminals in junction box (refer to Wiring Diagram Manual). Install junction box cover and safety-wire cover attachment bolts.	A
(15) Connect electrical harness to MLG down-lock switch and secure harness to jury brace with clamp (refer to 32-10-2).	
(16) Connect MLG electrical harness at quick disconnect at top of main wheel well, above MLG junction box.	A
(17) Secure tubing support brackets to MLG forward trunnion with eight bolts, washers, and nuts. Connect hydraulic lines (flexible hoses) to correct fittings at support bracket on upper side of MLG forward trunnion.	A,B

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-37.

Insert facing 32-1-1, Page 207, dated Sep.17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-2, substitute the following instruction where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 2.D.(21) and replace with the following:

(21) Service truck positioner with clean fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(18) Deleted.

(19) Remove MLG strut restraining clamps and support dolly.

(20) Service MLG shock strut with clean hydraulic fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(21) Charge truck positioner with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(22) Remove warning tags and close circuit breakers opened in step B.

(23) Deleted.

(24) Perform Adjustment/Test Main Landing Gear (refer to 32-1-0).

(25) Perform Adjustment/Test MLG Fairing (refer to 32-13-2, steps 2.B.(3), 2.B.(4), and 2.C.(6) thru 2.C.(14)).

(26) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

(27) Bleed MLG brakes (refer to 32-8-0, Adjustment/Test Brakes - Bleeding Procedure).

3. Removal/Installation MLG Shock Strut Seals (see Figure 202)

A. Equipment Required.

(1) Airplane jacking equipment.

(2) Suitable dolly to support MLG truck.

(3) Gland nut spanner wrench.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

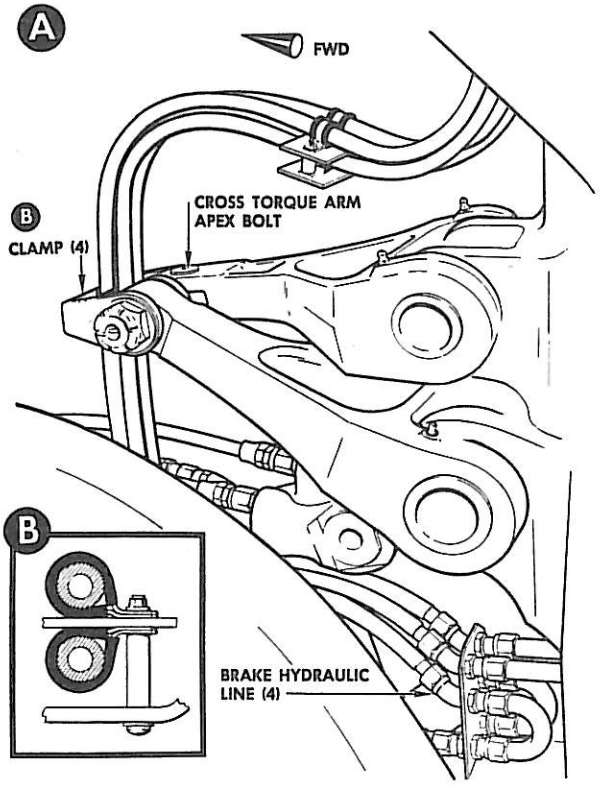
(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

HYD PUMP MOTOR CONT.

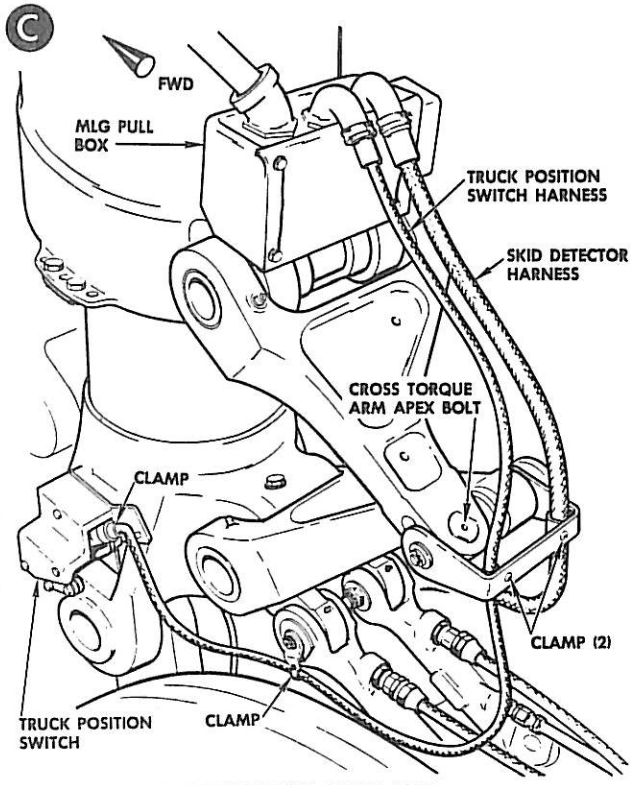
ANTI-SKID MAIN POWER, CONT, AND WARN.

LANDING GEAR POS & WARN.

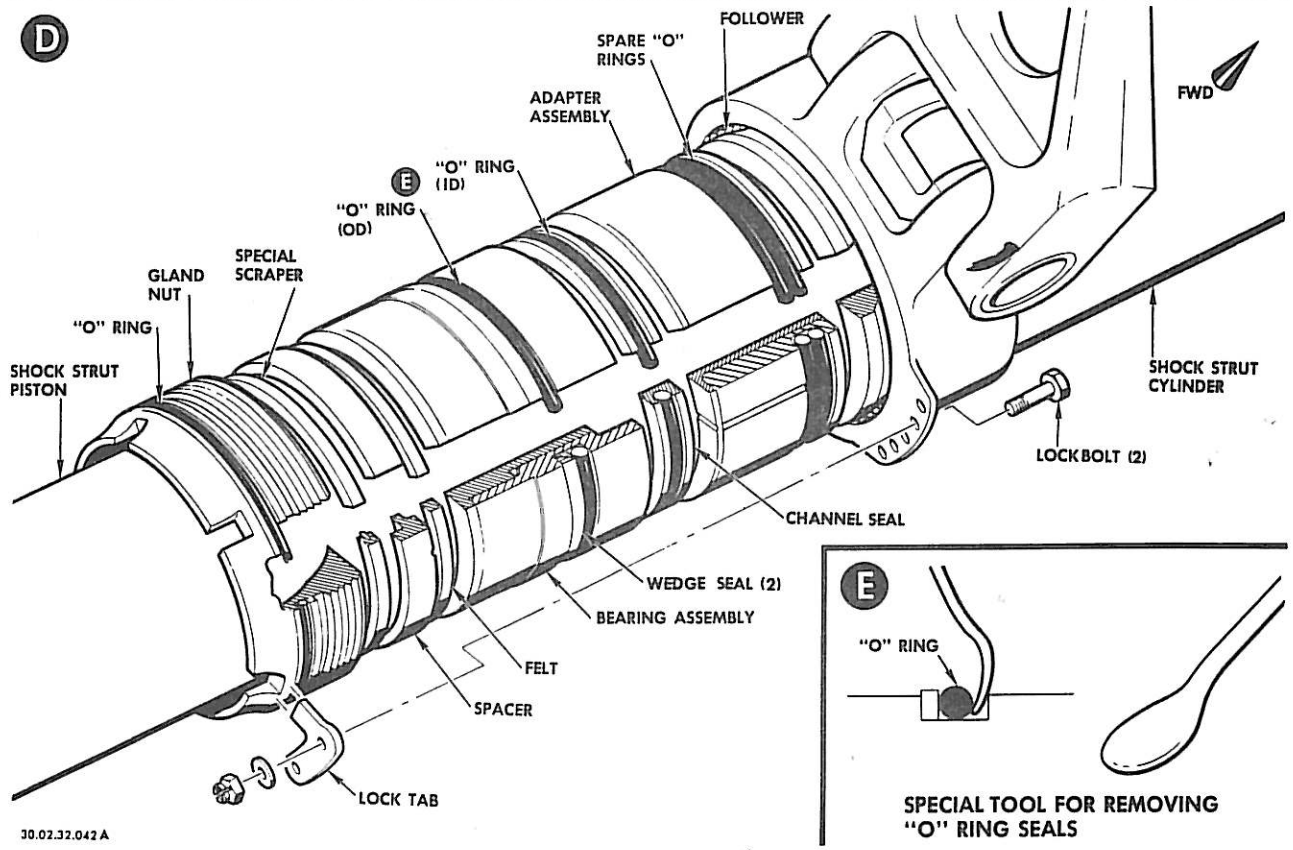
LANDING GEAR HANDLE SOLENOID.



MLG FORWARD TORQUE ARMS AND BRAKE HYDRAULIC LINE CONNECTIONS



MLG AFT TORQUE ARMS AND ELECTRICAL HARNESS CONNECTIONS



SPECIAL TOOL FOR REMOVING "O" RING SEALS

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-39.

Insert facing 32-1-1, Page 209, dated Sep. 17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-5, substitute the following instruction where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 3.C.(12) and replace with the following:	Figure Detail
(12) Cut and remove worn "O" rings at bearing assembly without damaging backup rings.	D,E

(3) Check that landing gear ground safety pins are installed.

(4) Jack airplane as required to allow installation of support dolly under MLG truck (refer to Chapter 7, LIFTING AND SHORING).

C. Remove MLG Shock Strut Seals.

	Figure Detail
(1) Relieve air pressure and drain hydraulic fluid from MLG shock strut (refer to Chapter 12, SERVICING).	
(2) Relieve air pressure in MLG truck positioner (refer to Chapter 12, SERVICING).	
(3) Remove nuts, clamps, plate, spacers, screws, and washers securing hydraulic lines to MLG forward torque arm bracket. Identify and disconnect hydraulic lines (flexible hoses) at MLG truck.	A,B
(4) Remove MLG pull box cover and disconnect skid detector harness at terminals in pull box. Disconnect harness conduit from pull box and pull disconnected wires from box.	C
(5) Remove nuts, screws, and clamps securing skid detector and truck position switch harness conduits to MLG aft torque arm bracket.	C
(6) Remove screws and clamps securing truck position switch harness conduit to bracket at brake equalizer link, and at MLG truck position switch. Disconnect harness from truck position switch.	C
(7) Disconnect MLG forward and aft torque arms by removing cotter pins, nuts, washers, and cross torque arm apex bolts.	A,C
(8) Remove nuts, washers, and two bolts from gland nut lock tab; remove lock tab.	D
(9) Using spanner wrench, loosen shock strut gland nut until it is free from cylinder.	D
(10) Remove ground safety pin from MLG jury brace and disengage down-lock.	
(11) Using dolly under MLG truck, pull gear inboard until piston is extended far enough to expose adapter assembly and spare "O" ring packings.	D
NOTE: It is not necessary to remove the piston from the cylinder unless the spare "O" rings have been used.	
(12) Cut and remove worn "O" rings at bearing assembly without damaging wedge and channel seals.	D,E

Figure Detail

D. Install MLG Shock Strut Seals.

(1) Replace worn "O" rings with spare "O" rings. The uppermost spare is for bearing ID. Bottom spare "O" ring is for bearing OD. — D,E

NOTE: If piston is removed from strut cylinder, install new spare "O" rings. Lubricate parts with hydraulic fluid, specification MIL-H-6083 or MIL-H-5606, to facilitate assembly.

(2) Using dolly, move gear back to the down-and-locked position and slide the following parts back into cylinder assembly: follower, adapter assembly, bearing assembly with "O" ring packings, wedge and channel seals, felt, spacer, and special scraper. Make certain these parts are properly seated. — D

CAUTION: BE CAREFUL NOT TO NICK, MAR OR OTHERWISE DAMAGE FINISH ON SHOCK STRUT PISTON. USE PROTECTIVE COVERING AS NECESSARY.

NOTE: The elastomer (buna rubber seal) portion of the special scraper ring may swell slightly during use, thus causing reinstallation to be difficult. The elastomer may be cut and shortened, if necessary, to facilitate scraper ring installation; however, ends of cut elastomer must meet when installed on the metal scraping ring. The special scraper ring must be replaced if metal portion is damaged or if elastomer shows extensive nibbling or deterioration.

(3) Thread gland nut, with "O" ring in OD groove, into cylinder assembly and tighten with spanner wrench. — D

(4) Position lock tab in gland nut slot and secure to flange on shock strut cylinder with two bolts, washers, and nuts. — D

(5) Connect MLG forward and aft torque arms at apex with cross torque arm apex bolts, washers, and nuts. Secure nuts with cotter pins. — A,C

(6) Connect truck position switch harness to switch. Secure harness conduit to switch support bracket with clamp and screw. — C

TEMPORARY REVISION NO. 32-40.

Insert facing 32-1-1, Page 210, dated Sep. 17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-5, substitute the following instruction where indicated.

Retain this temporary revision in your manual until applicable airplanes have been modified per noted service bulletin.

Delete text in step 3.D.(2) and replace with the following:

Figure Detail D

(2) Using dolly, move gear back to the down-and-locked position and slide the following parts back into cylinder assembly: follower, adapter assembly, bearing assembly with "O" ring packings and backup rings, felt, spacer, and special scraper. Make certain these parts are properly seated.

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-41.

Insert facing 32-1-1, Page 211, dated Sep. 17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-2, substitute the following instruction where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 3.D.(13) and replace with the following:

(13) Service truck positioner with clean fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

	Figure Detail
(7) Install clamp and screw securing truck position switch harness conduit to bracket at aft brake equalizer link. Install clamps, screws, and nuts securing skid detector and truck position switch harness conduits to bracket on MLG aft torque arms.	C
(8) Connect skid detector harness conduit to MLG pull box and connect correct wires together at terminals in pull box (refer to Wiring Diagram Manual). Install pull box cover and safety-wire cover attachment bolts.	C
(9) Connect hydraulic lines (flexible hoses) to correct fittings at MLG truck, as identified in step C.(3).	A
(10) Install screws, washers, spacers, clamps, plate, and nuts securing hydraulic lines to bracket on MLG forward torque arms.	A,B
(11) Install ground safety pin in MLG down-lock and lower airplane to the ground (refer to Chapter 7, LIFTING AND SHORING).	
(12) Service shock strut with clean hydraulic fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).	
(13) Charge truck positioner with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).	
(14) Remove warning tags and close circuit breakers opened in step B. (3).	
(15) Bleed MLG brakes (refer to 32-8-0).	

4. Removal/Installation MLG Shock Strut Piston

A. Scope of Work Involved.

The procedure for removing and installing the shock strut piston is the same as removal/installation of the shock strut seals except that the piston is pulled clear of the strut cylinder.

CAUTION: AS THE PISTON IS PULLED CLEAR OF THE STRUT CYLINDER, BOTH PISTON AND CYLINDER MUST BE SUPPORTED TO PREVENT DAMAGING THE METERING PIN.

MAIN LANDING GEAR (MLG) UP-LOCK AND SIDE BRACE ASSEMBLY - MAINTENANCE PRACTICES

1. Servicing MLG Up-Lock and Side Brace Assembly (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Up-Lock Assembly (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      LANDING GEAR POS & WARN.

      (3) Check that landing gear ground safety pins are installed.

      (4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

   C. Remove MLG Up-Lock Assembly.

      (1) Disconnect electrical harness to MLG up-lock switch (refer to 32-10-3).

      (2) Disconnect sequence valve push rod at fork on MLG door sequence valve (refer to 32-2-3).

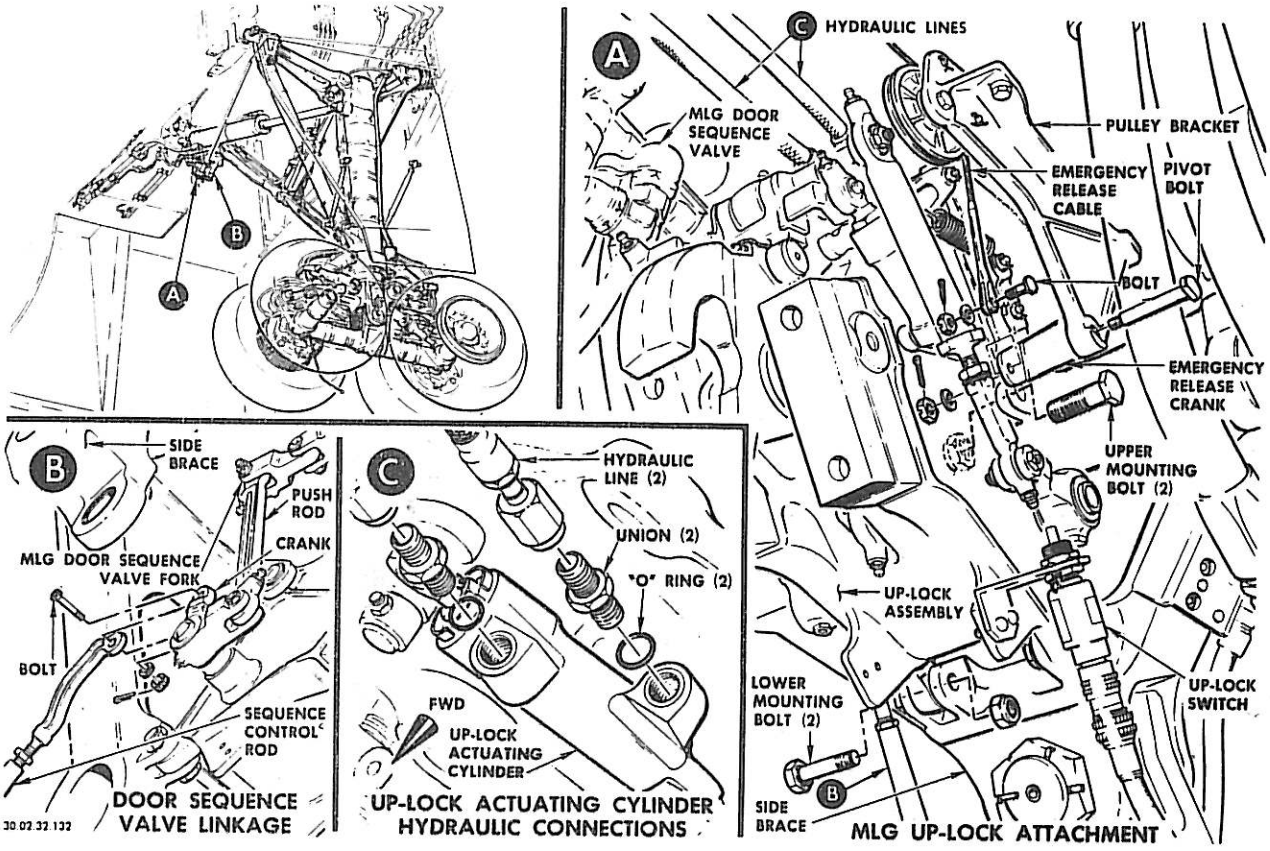
      (3) Remove cotter pin, nut, washer, and bolt securing upper end of sequence control rod assembly to crank on side of MLG up-lock.

      (4) Remove cotter pin, nut, washer, and bolt connecting emergency release cable to up-lock emergency release crank.

      (5) Remove cotter pin, nut, and bolt securing up-lock emergency release crank to pully bracket in top of main wheel well.

      (6) Disconnect two hydraulic lines (flexible hoses) from MLG up-lock actuating cylinder.

      (7) Remove nuts and four bolts attaching up-lock assembly to lugs at upper end of MLG side brace; remove MLG up-lock assembly.


A
B
C
HYDRAULIC LINES
MLG DOOR SEQUENCE VALVE
PULLEY BRACKET
EMERGENCY RELEASE CABLE
PIVOT BOLT
BOLT
EMERGENCY RELEASE CRANK
UPPER MOUNTING BOLT (2)
UP-LOCK ASSEMBLY
UP-LOCK SWITCH
LOWER MOUNTING BOLT (2)
SIDE BRACE
MLG UP-LOCK ATTACHMENT
SIDE BRACE
PUSH ROD
CRANK
MLG DOOR SEQUENCE VALVE FORK
BOLT
SEQUENCE CONTROL ROD
DOOR SEQUENCE VALVE LINKAGE
30.02.32.132
HYDRAULIC LINE (2)
UNION (2)
"O" RING (2)
FWD
UP-LOCK ACTUATING CYLINDER
UP-LOCK ACTUATING CYLINDER HYDRAULIC CONNECTIONS

D. Install MLG Up-Lock Assembly.

(1) Align MLG up-lock assembly with attachment lugs at upper end of MLG side brace; install four bolts and nuts.

(2) Connect two hydraulic lines (flexible hoses) to correct ports of MLG up-lock actuating cylinder.

(3) Align up-lock emergency release crank with pulley bracket in top of main wheel well and install bolt and nut. Torque nut finger-tight and secure with cotter pin.

(4) Connect emergency release cable to up-lock emergency release crank with bolt, washer, and nut. Tighten nut until clearance between nut and washer is 0.005 to 0.010 inch; secure nut with cotter pin.

(5) Connect upper end of sequence control rod assembly to crank on side of MLG up-lock with bolt, washer, and nut. Secure nut with cotter pin.

(6) Connect sequence valve push rod to fork on MLG door sequence valve (refer to 32-2-3).

(7) Connect electrical harness to MLG up-lock switch (refer to 32-10-3).

(8) Remove warning tags and close circuit breakers opened in step B.

(9) Deleted.

(10) Deleted.

(11) Deleted.

(12) Perform Adjustment/Test Main Landing Gear (refer to 32-1-0).

NOTE: If only the MLG up-lock assembly has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-1-0, steps 2.C.(2) thru 2.C.(6), 2.D.(3), 2.D.(7), and 2.D.(11) thru 2.D.(18). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.G.(excluding NLG checks), and 2.I.

(13) Deleted.

3. Removal/Installation MLG Side Brace (see Figure 202)

A. Equipment Required. Airplane jacking equipment.

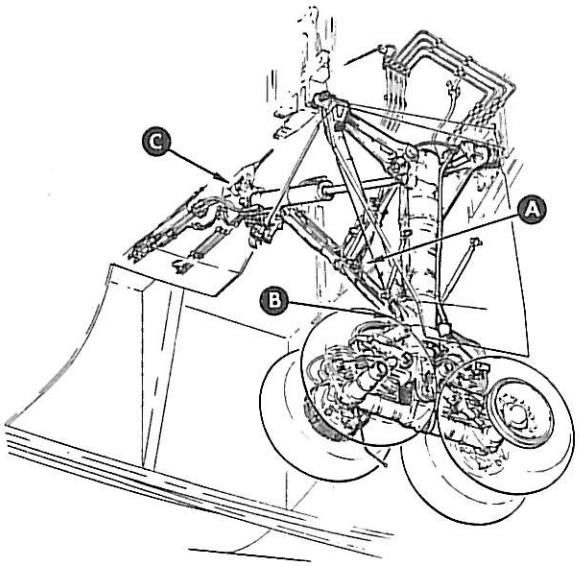
B. Preparation.

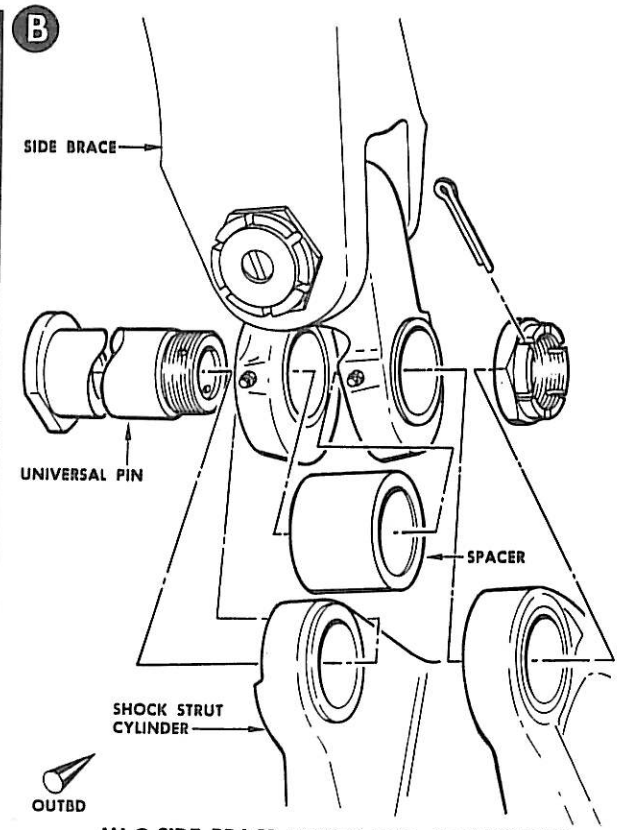
(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

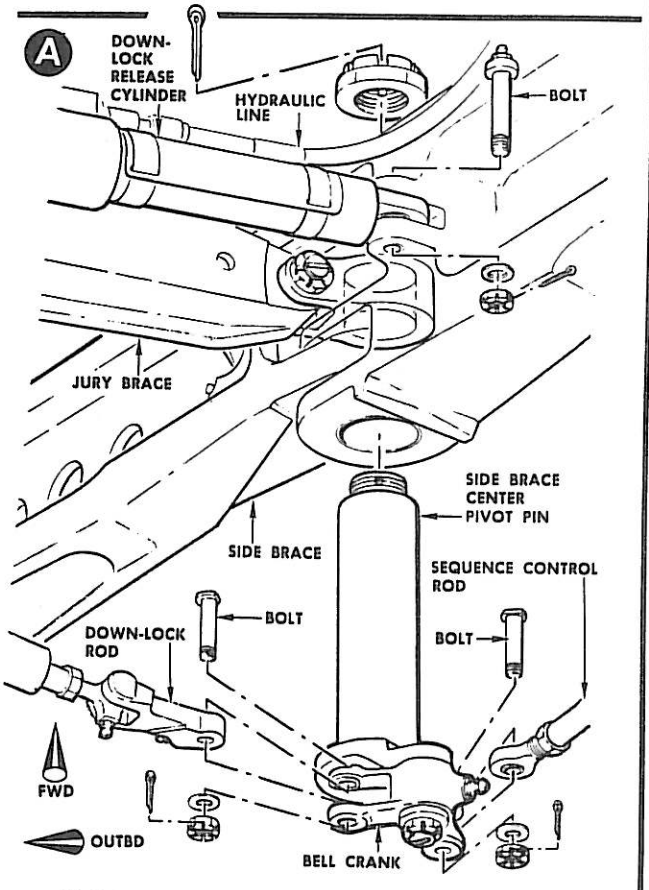
HYD PUMP MOTOR CONT.

LANDING GEAR POS & WARN.



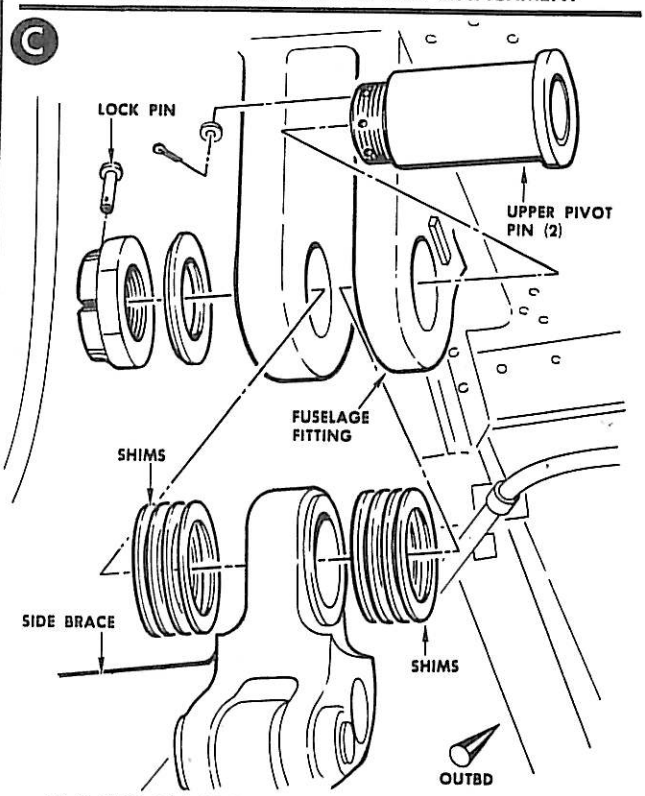


MLG SIDE BRACE LOWER END ATTACHMENT



MLG SIDE BRACE CENTER PIVOT PIN INSTALLATION

30.02.32.046



MLG SIDE BRACE FORWARD UPPER ATTACHMENT
AFT UPPER ATTACHMENT SAME
EXCEPT HEAD OF PIVOT PIN FACES AFT

(3) Check that landing gear ground safety pins are installed.

(4) Jack airplane as necessary to support airplane for safe removal of MLG side brace (refer to Chapter 7, LIFTING AND SHORING).

(5) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Side Brace.

(1) Remove MLG up-lock assembly from upper end of side brace (refer to Removal/Installation MLG Up-Lock Assembly).

(2) Remove MLG actuating cylinder (refer to 32-2-4).

(3) Disconnect hydraulic line to down-lock release cylinder at upper end of side brace and at down-lock release cylinder.

(4) Disconnect down-lock release cylinder at MLG side brace (refer to 32-2-6).

(5) Disconnect down-lock rod and the lower end of sequence control rod assembly, at bell crank on MLG side brace pivot pin. Temporarily remove side brace pivot pin and disconnect jury brace from the side brace (refer to 32-1-3).

(6) Remove cotter pin, nut, universal pin, and spacer securing lower end of MLG side brace to shock strut.

CAUTION: MAKE SURE SIDE BRACE IS ADEQUATELY SUPPORTED PRIOR TO REMOVAL FROM AIRPLANE.

(7) Remove cotter pins, washers, and pins securing side brace upper pivot pin nuts; remove pivot pin nuts and washers.

(8) Remove side brace upper pivot pins and shims; remove side brace from airplane.

NOTE: Record thickness of shims used at the side brace upper pivot pins, to facilitate side brace installation.

D. Install MLG Side Brace.

(1) Align side brace upper fittings with attachment fittings in airplane; install pivot pins and shims (preliminary shim thickness determined in step 3.C.(8) of removal procedure).

(2) Align lower end of the side brace with lugs on shock strut; install spacer, universal pin, and nut. Tighten nut firmly, then back off to nearest castellation and secure with cotter pin.

CAUTION: THE SIDE BRACE-TO-SHOCK STRUT ATTACHMENT MUST BE A SLIP-FIT; ANY EXTREME MISALIGNMENT WILL CAUSE BINDING WHEN GEAR IS RETRACTED. ADJUST SHIMS AT THE SIDE BRACE UPPER PIVOT PINS TO PROVIDE PROPER ALIGNMENT.

(3) Check the side brace upper pivot pin clearances (refer to 32-1-0, step 2.D.(1)(a)) and install pivot pin washers and nuts. Torque pivot pin nuts to 50 (±5) inch-pounds; secure nuts with pins, washers, and cotter pins.

(4) Connect free end of MLG jury brace to the side brace, and connect down-lock rod and lower end of the sequence control rod assembly to bell crank on MLG side brace pivot pin (refer to 32-1-3).

(5) Connect down-lock release cylinder to MLG side brace (refer to 32-2-6).

(6) Connect down-lock release cylinder hydraulic line at cylinder and at upper end of MLG side brace.

(7) Install MLG actuating cylinder (refer to 32-2-4).

(8) Install MLG up-lock assembly (refer to Removal/Installation MLG Up-Lock Assembly).

(9) Remove warning tags and close circuit breakers opened in step B.

(10) Deleted.

(11) Deleted.

(12) Deleted.

(13) Perform Adjustment/Test Main Landing Gear (refer to 32-1-0).

NOTE: If only the MLG side brace has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-1-0, steps 2.C.(2) thru 2.C.(6), 2.D.(2), 2.D.(3), 2.D.(4), and 2.D.(7) thru 2.D.(18). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.G.(excluding NLG checks), and 2.I.

(14) Deleted.

MAIN LANDING GEAR (MLG) JURY BRACE - MAINTENANCE PRACTICES

1. Servicing MLG Jury Brace (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Jury Brace (see Figure 201)

   A. Equipment Required. Airplane jacking equipment.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      LANDING GEAR POS & WARN.

      WARN HORN.

      ANTI-SKID CONT, and WARN (applicable to RH MLG jury brace removal/ installation only).

      (3) Check that landing gear ground safety pins are installed.

      (4) Jack airplane as necessary to support airplane for safe removal of MLG jury brace (refer to Chapter 7, LIFTING AND SHORING).

   C. Remove MLG Jury Brace.

      (1) Remove clamp securing electrical harness to MLG jury brace and disconnect harness from down-lock switch (refer to 32-10-2).

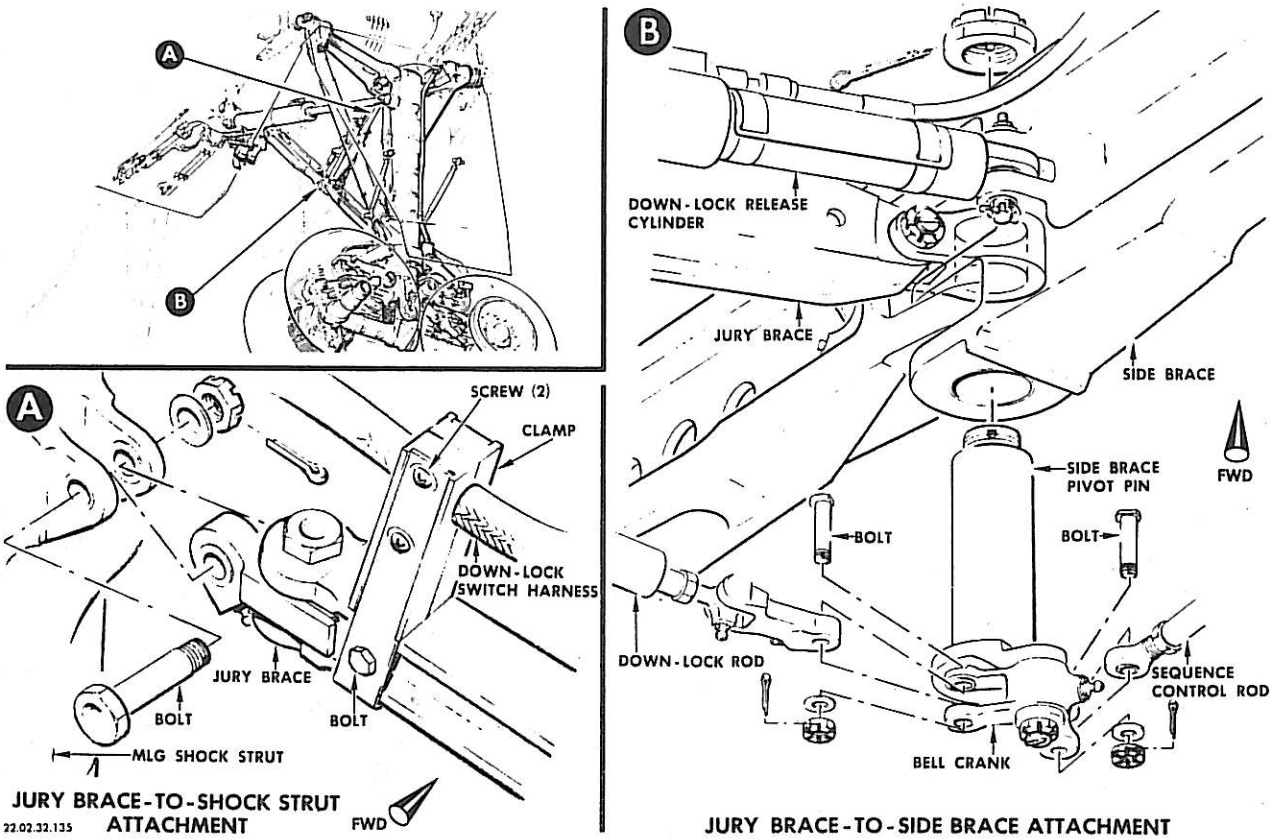
      (2) Remove cotter pin, nut, washer, and bolt securing lower end of sequence control rod assembly to bell crank at side brace pivot pin.

      (3) Remove cotter pin, nut, washer, and bolt securing down-lock rod to bell crank at side brace pivot pin.

      (4) Disconnect down-lock release cylinder at MLG jury brace (refer to 32-2-6).

      (5) With MLG side brace adequately supported, remove cotter pin, nut, and side brace pivot pin; separate jury brace from MLG side brace, and reinstall side brace pivot pin.

      (6) Remove cotter pin, nut, washer, and bolt attaching jury brace to MLG shock strut; remove jury brace.



JURY BRACE-TO-SHOCK STRUT ATTACHMENT

22.02.32.135

JURY BRACE-TO-SIDE BRACE ATTACHMENT

D. Install MLG Jury Brace.

(1) Align outboard end of MLG jury brace with lugs on shock strut; install bolt, washer, and nut. Snug-up nut, then back off to nearest castellation and secure with cotter pin.

(2) Align free end of MLG jury brace with side brace pivot pin lugs; install side brace pivot pin and nut. Tighten nut firmly, then back off to nearest castellation and secure with cotter pin.

(3) Connect down-lock release cylinder to MLG jury brace (refer to 32-2-6).

(4) Connect down-lock rod to bell crank at MLG side brace pivot pin with bolt, washer, and nut. Secure nut with cotter pin.

(5) Connect sequence control rod assembly to bell crank at MLG side brace pivot pin with bolt, washer, and nut. Secure nut with cotter pin.

(6) Connect electrical harness to down-lock switch and secure harness to jury brace with clamp (refer to 32-10-2).

(7) Remove warning tags and close circuit breakers opened in step B.

(8) Perform Adjustment/Test Main Landing Gear (refer to 32-1-0).

NOTE: If only the MLG jury brace has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-1-0, steps 2.C.(2), 2.D.(2), 2.D.(4), and 2.D.(7). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5) (d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

(9) Deleted.

MAIN LANDING GEAR (MLG) TRUCK ASSEMBLY - MAINTENANCE PRACTICES

1. Servicing MLG Truck Assembly (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Truck Assembly (see Figure 201)

   A. Equipment Required. Airplane jacking equipment.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      ANTI-SKID MAIN POWER, CONT, and WARN.

      LANDING GEAR POS & WARN.

      LANDING GEAR HANDLE SOLENOID.

      (3) Check that landing gear ground safety pins are installed.

      (4) Jack airplane as necessary to support airplane for safe removal of MLG truck assembly (refer to Chapter 7, LIFTING AND SHORING).

   C. Remove MLG Truck Assembly.

      (1) Relieve air pressure in MLG shock strut and truck positioner (refer to Chapter 12, SERVICING).

      (2) Identify and disconnect four hydraulic lines (flexible hoses) at MLG truck.

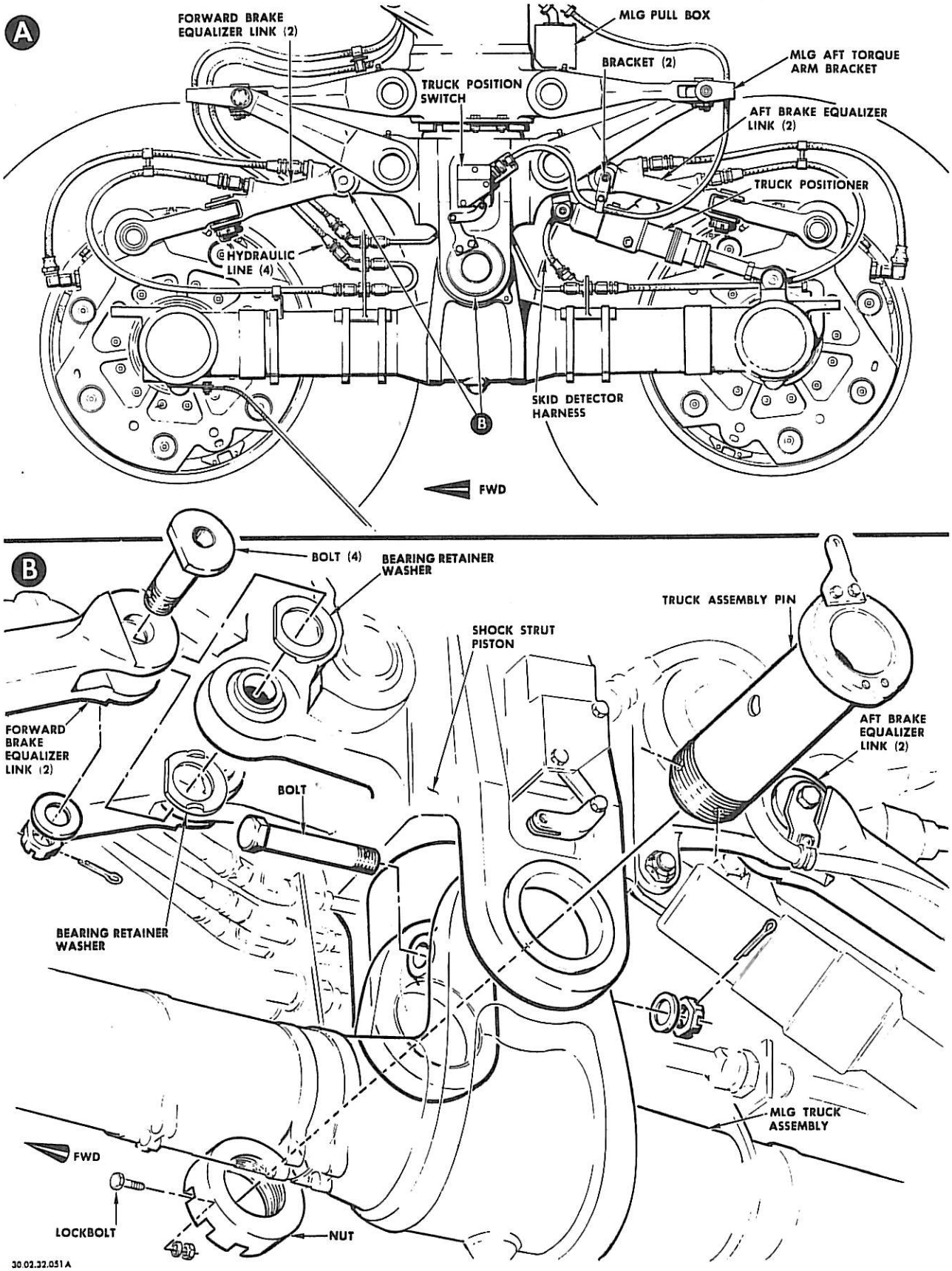
      (3) Remove MLG pull box cover and disconnect skid detector harness at terminals in pull box. Disconnect harness conduit from pull box and pull disconnected wires from box.

      (4) Remove nut, screw, and clamp securing skid detector harness to MLG aft torque arm bracket.

      (5) Remove screws and clamps securing skid detector and truck position switch harnesses to brackets at aft brake equalizer links.

      (6) Disconnect truck position switch linkage (refer to 32-10-1).

      (7) Remove cotter pins, nuts, washers, and four bolts attaching forward and aft brake equalizer links to shock strut piston.


A
FORWARD BRAKE EQUALIZER LINK (2)
MLG PULL BOX
BRACKET (2)
MLG AFT TORQUE ARM BRACKET
TRUCK POSITION SWITCH
AFT BRAKE EQUALIZER LINK (2)
TRUCK POSITIONER
HYDRAULIC LINE (4)
SKID DETECTOR HARNESS
B
FWD
B
BOLT (4)
BEARING RETAINER WASHER
TRUCK ASSEMBLY PIN
SHOCK STRUT PISTON
FORWARD BRAKE EQUALIZER LINK (2)
AFT BRAKE EQUALIZER LINK (2)
BOLT
BEARING RETAINER WASHER
MLG TRUCK ASSEMBLY
FWD
LOCKBOLT
NUT
30.02.32.051 A

CORVAIR MODEL 32

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-6.

Insert facing 32-I-4, Page 203, dated June 22/64 (or subsequent). This temporary revision supersedes Temporary Revision No. 32-5, dated May 15/64.

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-46, delete NOTE indicated.

Retain this temporary revision in your manual till all applicable airplanes have been modified per noted service bulletin.

Delete the NOTE following step 2.D.(1) for unmodified airplanes.

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-84.

Insert facing 32-1-4, Page 203, dated June 22/64 (or subsequent). This temporary revision supersedes Temporary Revision No. 32-76, dated May 15/63.

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-46, delete NOTE indicated.

Retain this temporary revision in your manual till all applicable airplanes have been modified per noted service bulletin.

Delete the NOTE following step 2.D.(1) for unmodified airplanes.

(8) Disconnect forward end of truck positioner from shock strut piston (refer to 32-1-5).

(9) Remove nut, washer, and lockbolt securing truck assembly pin nut; remove nut.

(10) Remove cotter pin, nut, washer, and bolt which passes through the truck assembly and truck assembly pin.

(11) With truck assembly adequately supported, remove truck assembly pin and separate truck assembly from shock strut piston.

D. Install MLG Truck Assembly.

(1) With truck assembly adequately supported, align center lugs with lugs of shock strut piston; install truck assembly pin.

NOTE: The truck assembly pin has provisions for attachment of the truck position switch arm at two places, 180 degrees apart. The pin can be installed in either of two positions by relocating the truck position switch arm and rotating the pin to align boltholes through truck assembly and pin.

(2) Install bolt, washer, and nut through truck assembly and pin. Secure nut with cotter pin.

(3) Install truck assembly pin nut and tighten till it just contacts piston bushing, then back off as required to install lockbolt. Secure nut with lockbolt, washer, and nut.

(4) Connect free end of truck positioner to shock strut piston (refer to 32-1-5).

(5) Align free ends of forward and aft brake equalizer links with lugs on shock strut piston, with bearing retainer washers at each side of piston lug bearings and install bolts, washers, and nuts. Tighten nuts to torque value of 18 to 22 inch-pounds and secure with cotter pins.

(6) Connect truck position switch linkage (refer to 32-10-1).

(7) Install screws and clamps securing skid detector and truck position switch harnesses to brackets at the aft brake equalizer links.

(8) Install clamp, screw, and nut securing skid detector harness to MLG aft torque arm bracket.

(9) Connect skid detector harness conduit to MLG pull box and connect correct wires together at terminals in pull box (refer to Wiring Diagram Manual). Install pull box cover and safety-wire cover attachment bolts.

(10) Connect four hydraulic lines (flexible hoses) to correct fittings on MLG truck assembly, as identified in step 2.C.(2).

(11) Service MLG shock strut with clean hydraulic fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(12) Service truck positioner with clean fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(13) Remove warning tags and close circuit breakers opened in step B.

(14) Check truck positioner neutral position and truck position switch adjustment (refer to 32-1-0, step 2.D.(5)).

(15) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

NOTE: If the MLG truck only has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(10), 2.C.(11), 2.D.(3), 2.I.(3), and 2.I.(5).

(16) Bleed MLG brakes (refer to 32-8-0).

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-85.

Insert facing 32-1-4, Page 204, dated June 22/64 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes using truck positioners, Cleveland Pneumatic Tool Co. Part Number 9991C-210H and -210J, substitute the following instructions where indicated.

Retain this temporary revision in your manual till noted truck positioners have been replaced.

Delete text in step 2.D.(12) and replace with the following:

(12) Charge truck positioner with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-85.

Insert Testing 32-1-4, Page 203, dated June 22/64 (or subsequent).

The instructions on the noted Testing pages are to be used for all applicable airplanes except as follows: for airplanes using truck positioners, Cleveland Pneumatic Tool Co. Part Number 99910-210H and -210J, substitute the following instructions where indicated.

Retain this temporary revision in your manual till noted truck positioners have been replaced.

Delete text in step S.D.(12) and replace with the following:

(12) Charge truck positioner with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

MAIN LANDING GEAR (MLG) TRUCK POSITIONER - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. TRUCK POSITIONER FAILS TO PROPERLY POSITION MLG TRUCK	
A. Air leak at air valve	Check for loose air valve body. Torque valve body 100 to 110 inch-pounds. Torque hexagon swivel nut 50 to 70 inch-pounds. Depressurize truck positioner and check for deteriorated "O" ring at air valve. Replace defective "O" ring. If valve still leaks, replace air valve.
B. Air leak at gland or in air gage assembly.	Depressurize and replace entire unit.
C. Air leak at drain plug.	Depressurize unit and check plug gasket for deterioration; replace gasket. Torque plug 100 to 110 inch-pounds.
D. Piston rod or inner cylinder sticks or binds.	Depressurize and replace entire unit.

MAIN LANDING GEAR (MLG) TRUCK POSITIONER - MAINTENANCE PRACTICES

1. Servicing MLG Truck Positioner (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Truck Positioner (see Figure 201)

   A. Equipment Required - None.

   B. Remove MLG Truck Positioner.

      (1) Relieve air pressure from MLG truck positioner (refer to Chapter 12, SERVICING).

      (2) Remove nuts, washers, and bolts at both ends of positioner and remove unit from MLG assembly.

      CAUTION: DO NOT COMPRESS TRUCK POSITIONER TO LESS THAN 16.78 INCHES BETWEEN BEARING CENTERS WITH CYLINDER DEPRESSURIZED. IT IS POSSIBLE TO UNSEAT FLOATING PISTON SEALS.

   C. Install MLG Truck Positioner.

      (1) Place truck positioner in correct position and secure with bolts, washers, and nuts. Tighten nuts to torque value of 18 to 20 inch-pounds above driving torque.

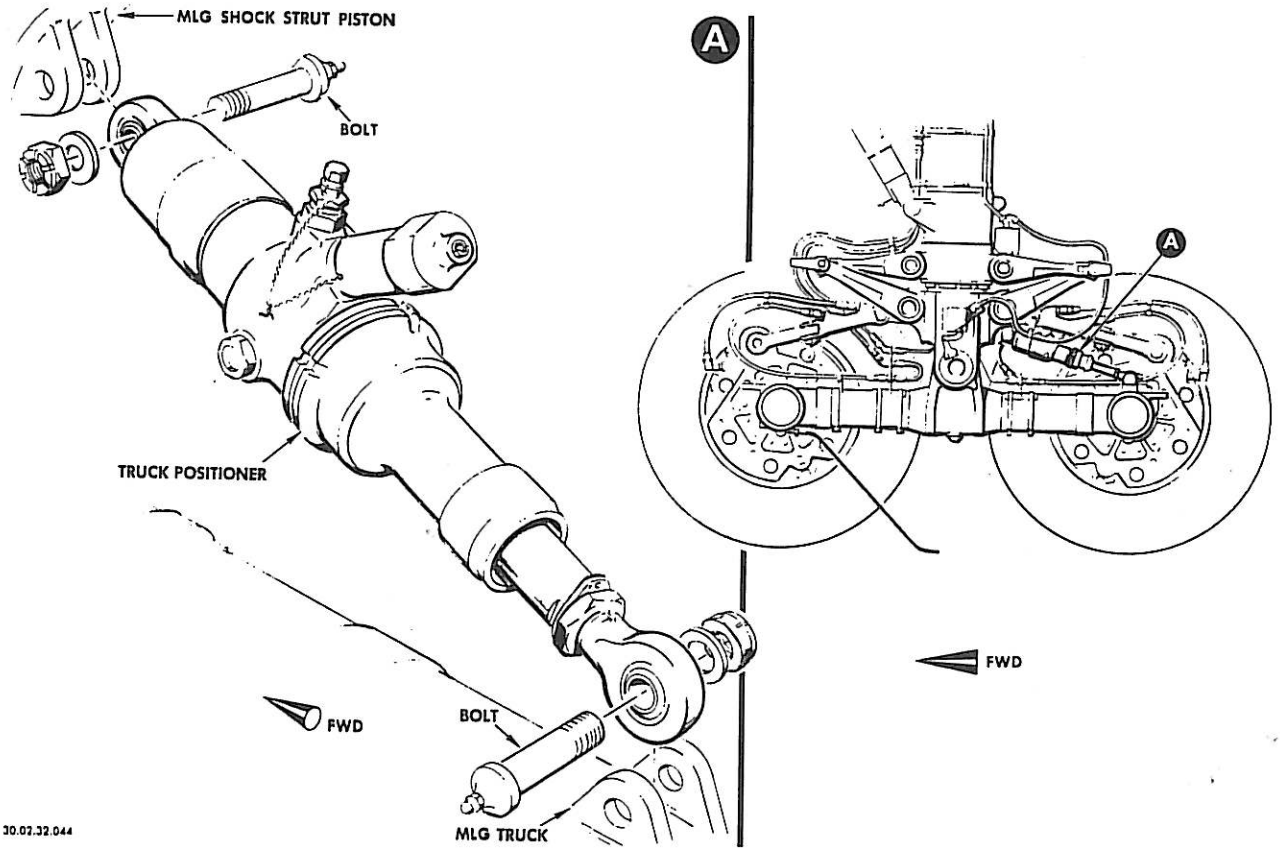
      (2) Check truck positioner fluid level and charge positioner with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

      CAUTION: ALWAYS CHECK AND CORRECT FLUID LEVEL PRIOR TO PLACING POSITIONER IN SERVICE. AN OVERFILLED POSITIONER CAN CAUSE SERIOUS DAMAGE TO LANDING GEAR AND/OR THE POSITIONER.

      (3) Adjust truck positioner and truck position switch (refer to 32-1-0, steps 2.C.(2) and 2.D.(5)).

      (4) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

      NOTE: If only the truck positioner has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(10), 2.C.(11), 2.D.(3), 2.I.(3) and 2.I.(5).



Main Landing Gear Truck Positioner Installation
Figure 201

MAIN LANDING GEAR (MLG) WHEEL ASSEMBLIES - MAINTENANCE PRACTICES

1. Servicing MLG Wheels and Tires (refer to Chapter 12, SERVICING)

2. Removal/Installation MLG Wheels and Tires (see Figure 201)

   A. Equipment Required.

      (1) Wheel change support dolly.

      (2) MLG hydraulic jack.

      (3) Heavy duty tire bead breaking device for breaking tire beads loose from wheel flanges.

      (4) Axle thread protector.

   B. Materials Required.

      (1) Laundry soap, bar soap, or detergent solution to clean replacement tire.

      (2) Denatured alcohol, Specification MIL-A-6019 to clean wheel flange bead seats and wheel mating surfaces.

      (3) Dow Corning Silicone Insulating and Sealing Compound DC-4 to lubricate wheel "O" ring seal.

      (4) Antiseize compound, Specification MIL-T-5544 to lubricate wheel tie bolts.

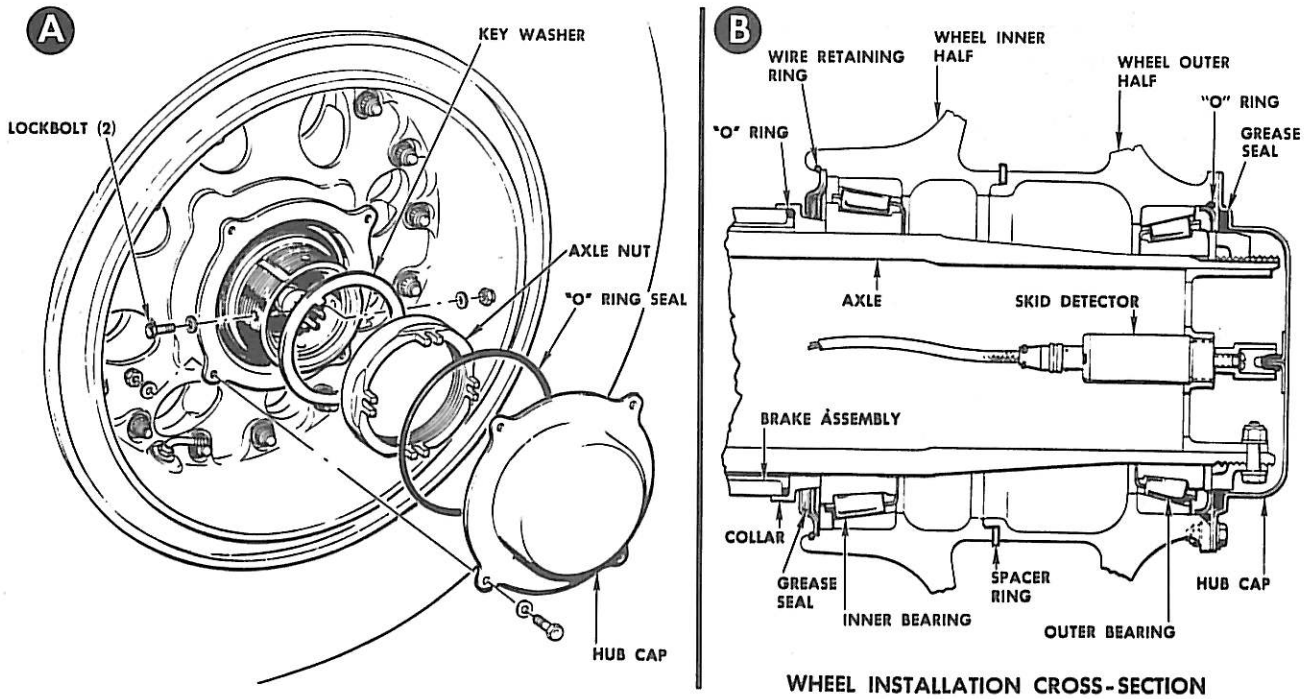
      (5) Insignia red aircraft enamel, Specification MIL-E-7729, Type 1 to mark wheel and tire to determine wheel slippage in service.

      (6) Wheel bearing grease, Specification MIL-G-25760.

      NOTE: AEROSHELL Grease 5 (Shell Oil Co.), Specification MIL-L-3545A, is an approved substitute for the referenced wheel bearing grease. However, if substitute grease is used, parts must be thoroughly cleaned of former lubricant as greases are not compatible.

   C. Remove MLG Wheel and Tire.

	Figure Detail
(1) Jack truck assembly at forward or aft jacking point until wheel to be removed is clear of ground (refer to Chapter 7, LIFTING AND SHORING).	
(2) Place wheel change dolly in position and support wheel assembly to be removed.	
(3) Deflate tire to approximately 20 psig.	
(4) Remove four bolts securing hub cap to wheel; remove hub cap.	A,B
(5) Remove two lockbolts that secure axle nut to the axle; remove axle nut and key washer.	A



WHEEL INSTALLATION CROSS-SECTION

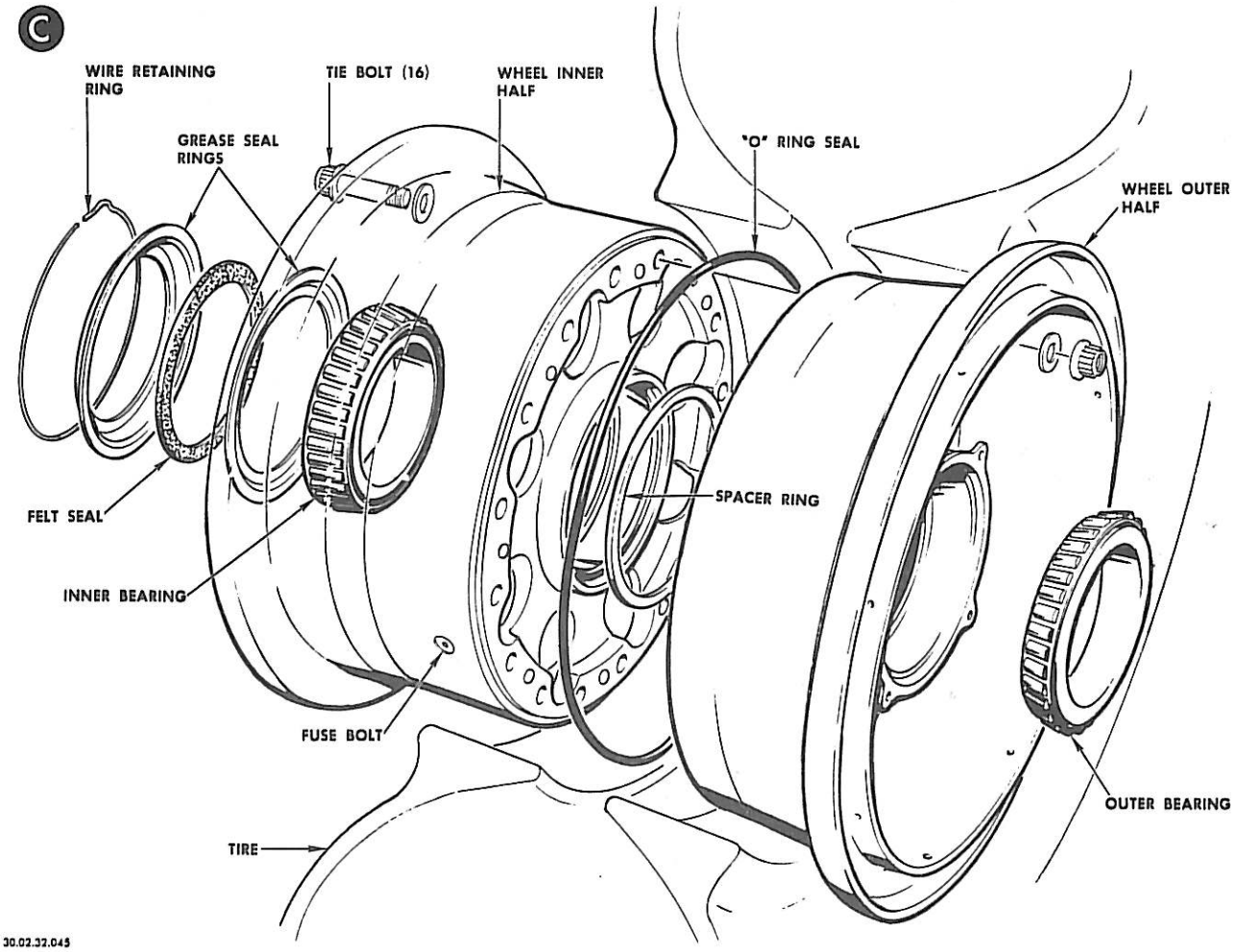


Figure Detail

(6) Remove outer bearing from wheel. B,C

(7) Install axle thread protector and remove wheel from axle, being careful not to damage inner bearing and axle.

(8) From wheel inner half remove wire retaining ring, grease seal ring, felt seal, grease seal ring, and bearing. B,C

NOTE: Steps C.(9) through C.(13) need be accomplished only if wheel and tire assembly is to be disassembled.

(9) Remove valve core and completely deflate tire.

(10) Break beads from both wheel flanges with a heavy duty bead breaking device by applying progressive pressure, in even increments, around the tire sidewall as close as possible to the tire beads.

CAUTION: DO NOT PRY BETWEEN FLANGE AND BEAD WITH SHARP TOOLS, OR THE WHEEL AND TIRE MAY BE DAMAGED.

(11) Remove sixteen tie bolts which secure wheel halves together. Separate wheel halves and remove tire. C

(12) Remove and discard wheel "O" ring seal from the wheel inner half. C

(13) Remove spacer ring between wheel halves. B,C

D. Install MLG Wheel and Tire.

NOTE: Steps D.(1) through D.(11) need be accomplished only if wheel and tire assembly must be assembled. Replacement tire must bear the same trade name as other tire on same truck axle.

(1) Clean and check wheel parts prior to assembly (refer to Inspection/Check Landing Gear Wheels-Visual Check, and Cleaning/Painting Landing Gear Wheels).

(2) Before mounting tire, make certain that tire is free of foreign material and bead areas are clean. Remove oil, grease, or other contamination from tire with laundry soap, bar soap, or detergent solution. Rinse thoroughly with water and wipe dry with clean cheesecloth.

(3) Visually check the tire, especially the bead area, for damage.

(4) Wipe wheel flange bead seat and wheel mating surfaces with a clean cloth dampened with denatured alcohol, Specification MIL-A-6019.

	Figure Detail
(5) Coat new wheel "O" ring seal with Dow Corning Silicone Insulating and Sealing Compound DC-4, and install seal on flange in wheel inner half.	C
NOTE: Seal must be equalized around wheel and not twisted.	
(6) Install spacer ring on wheel outer half.	B,C
(7) Place tubeless tire on wheel outer half with the red balance dot at valve stem.	C
(8) Position wheel inner half in tire with wheel spokes aligned with wheel outer half, and align the bolt holes, being careful to avoid misaligning or damaging "O" ring seal and spacer ring.	B,C
(9) Install wheel tie bolts as follows:	
(a) Lubricate bolt threads and bearing surfaces of nut, bolt head and washers with antiseize compound, Specification MIL-T-5544.	C
(b) Compress wheel sections together enough to allow installation of four bolts, special washers, and nuts. The bolts should be installed 90 degrees apart. Tighten bolts evenly until wheel halves seat.	C
NOTE: Special washers shall be installed on the bolts with the countersink facing bolt head and nut.	
(c) Install remaining tie bolts, special washers, and nuts.	C
(10) With tie bolts, washers and nuts lubricated per step (9)(a), preceding, tighten nuts in a crisscross sequence to the following torque values:	
(a) Preliminary Torque - approximately 450 inch-pounds for wheels not incorporating Bendix Service Bulletin No. 258 and 500 inch-pounds for wheels incorporating Bendix Service Bulletin No. 258.	
(b) Final Torque - 900 (±25) inch-pounds for wheels not incorporating Bendix Service Bulletin No. 258 and 1050 (±25) inch-pounds for wheels incorporating Bendix Service Bulletin No. 258.	

Figure Detail

(11) Inflate tire to 100 psig and leak check. After leak check is completed, deflate tire to approximately 20 psig. Mark tire and wheel rim with insignia red aircraft enamel, Specification MIL-E-7729, Type 1, to determine tire slippage in service.

WARNING: TIRE MUST NOT BE INFLATED TO OPERATING PRESSURE UNTIL AFTER WHEEL IS INSTALLED ON AIRPLANE.

(12) Check that axle and wheel bearing cups are clean. Pack wheel bearings with wheel bearing grease (refer to paragraph 2.B., item (6)).

(13) Install inner bearing, grease seal ring, felt seal, and grease seal ring in wheel inner half. Secure grease seal and bearing with wire retaining ring. — C

(14) Align keyways of brake rotor segment assemblies.

NOTE: Prior to accomplishing step (15), following, check that "O" ring seal and collar are installed on axle, outboard of brake assembly. — B

(15) Raise wheel dolly to align wheel with axle, then carefully slide wheel on axle, engaging rotor drive keys in keyways of brake rotor segment assemblies.

CAUTION: USE SPECIAL CARE TO NOT DAMAGE WHEEL INNER BEARING OR AXLE.

(16) Remove axle thread protector and install outer bearing in wheel. — B,C

(17) Lubricate threads and bearing surfaces of axle, axle nut, and key washer with wheel bearing grease (refer to paragraph 2.B., item (6)).

(18) Install key washer and axle nut. Remove wheel dolly. — A

(19) Rotate wheel and pretorque axle nut to 54 foot-pounds.

(20) With wheel static, back off axle nut to zero torque. Retorque axle nut to 27 foot-pounds. Tighten axle nut to nearest lockbolt hole.

(21) Check that wheel rotates freely and install two axle nut lockbolts. — A

Figure Detail

(22) Install hub cap and secure with four bolts.

NOTE: Prior to installing hub cap, check that felt seal is installed in groove inside hub cap and "O" ring seal is installed on mating flange of hub cap. A,B

(23) Inflate tire to proper pressure (refer to Chapter 12, SERVICING).

(24) Lower truck assembly and remove jack (refer to Chapter 7, LIFTING AND SHORING).

3. Inspection/Check Landing Gear Wheels - Visual Check

A. Visually check the following:

(1) Wheel for distortion, cracks, nicks, or other damage. Replace wheel if distortion or cracks are found. Scratches or nicks in the bead seat area may be locally removed to a depth of 0.010 inch by polishing to a finish of 20 microinches RMS maximum. Slight scratches or nicks on other surfaces of the wheel halves may be repaired by relieving all sharp corners or indentations which might result in concentration of stresses. Use a hand file and finish up with fine grit emery cloth to remove file marks.

NOTE: Cracks are most likely to occur around the wheel valve stem and tie bolt holes, and in the spoke or hub area.

(2) Brake rotor drive keys for security.

(3) Leaking thermal fuse bolts.

(4) Bearings and bearing cups for corrosive pitting, scratches, and heavy blue discoloration. Also check bearing cups in wheel for security.

(5) Wheel tie bolts for damaged threads and general condition.

(6) Tire for proper inflation (refer to Chapter 12, SERVICING).

(7) Valve stem assembly for damage, proper sealing, and security of installation.

(8) Hub cap for dents or cracks.

(9) For main wheel only, check skid detector drive lug in hub cap for distortion. Check that hub cap engages skid detector drive coupling when installed on wheel.

(10) For main wheel only, check heat shields for general condition and security.

(11) Check paint for chips, scratches, and general condition. Touch up paint in accordance with Chapter 51, STRUCTURES-GENERAL.

NOTE: Mating surfaces of wheel halves shall have one coat only of epoxy primer.

4. Cleaning/Painting Landing Gear Wheels

A. Materials Required.

(1) Dry cleaning solvent, Federal Specification P-S-661.

(2) Denatured alcohol, Specification MIL-A-6019.

(3) Wheel bearing grease, Specification MIL-G-25760.

NOTE: AEROSHELL Grease 5 (Shell Oil Co.), Specification MIL-L-3545A, is an approved substitute for the referenced wheel bearing grease. However, if substitute grease is used, parts must be thoroughly cleaned of former lubricant as greases are not compatible.

(4) Lubricating oil, Specification MIL-L-7870, Grade 10.

B. Preparation and Cleaning.

(1) Clean wheel parts, except wheel "O" ring seals, with dry cleaning solvent by spraying or soaking. Use a soft bristle brush to remove hardened grease, hydraulic fluid, dust and dirt.

NOTE: Wheel bearings shall be cleaned in a separate clean container.

(2) Clean "O" rings with denatured alcohol.

(3) Dry component parts thoroughly using clean, dry compressed air.

CAUTION: DO NOT SPIN BEARINGS WHEN DRYING WITH COMPRESSED AIR.

(4) Immediately after drying and visual check, apply a light film of wheel bearing grease (refer to paragraph 4.A., Item (3)) to bearing cups in each wheel half to prevent corrosion.

(5) Immediately after drying and visual check, pack wheel bearings with wheel bearing grease (refer to paragraph 4.A., item (3)). Grease must be forced in around bearing rollers.

(6) After drying and visual check, lightly saturate felt seals with lubricating oil, Specification MIL-L-7870, Grade 10.

NOTE: Protect wheel bearings and seals from contamination by placing component parts in a suitable container until installation. Place protective covers over wheel bearing cups in wheel.

(7) Paint touchup or wheel refinishing shall be accomplished in accordance with Chapter 51, STRUCTURES-GENERAL.

5. Removal/Installation MLG Wheel Thermal Fuse Bolts (see Figure 202)

A. Equipment Required. Necessary equipment to remove, disassemble, and install MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

B. Materials Required. Epoxy primer, Convair Specification 03021, Type 1 (Andrew Brown Co., Los Angeles, California).

C. Remove MLG Wheel Thermal Fuse Bolt.

(1) Jack airplane as necessary to remove applicable wheel (refer to Chapter 7, LIFTING AND SHORING).

(2) Remove and disassemble MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

(3) Locate blown or leaking thermal fuse bolt(s). Fuse bolts are located in four places, spaced around wheel inner half.

(4) Remove nut and washer securing thermal fuse bolt to wheel inner half; remove fuse bolt.

D. Install MLG Wheel Thermal Fuse Bolt.

(1) Place new "O" ring seal against shoulder of replacement thermal fuse bolt and insert into hole in wheel inner half.

(2) Install washer and nut on thermal fuse bolt; torque nut to 20 to 30 inch-pounds.

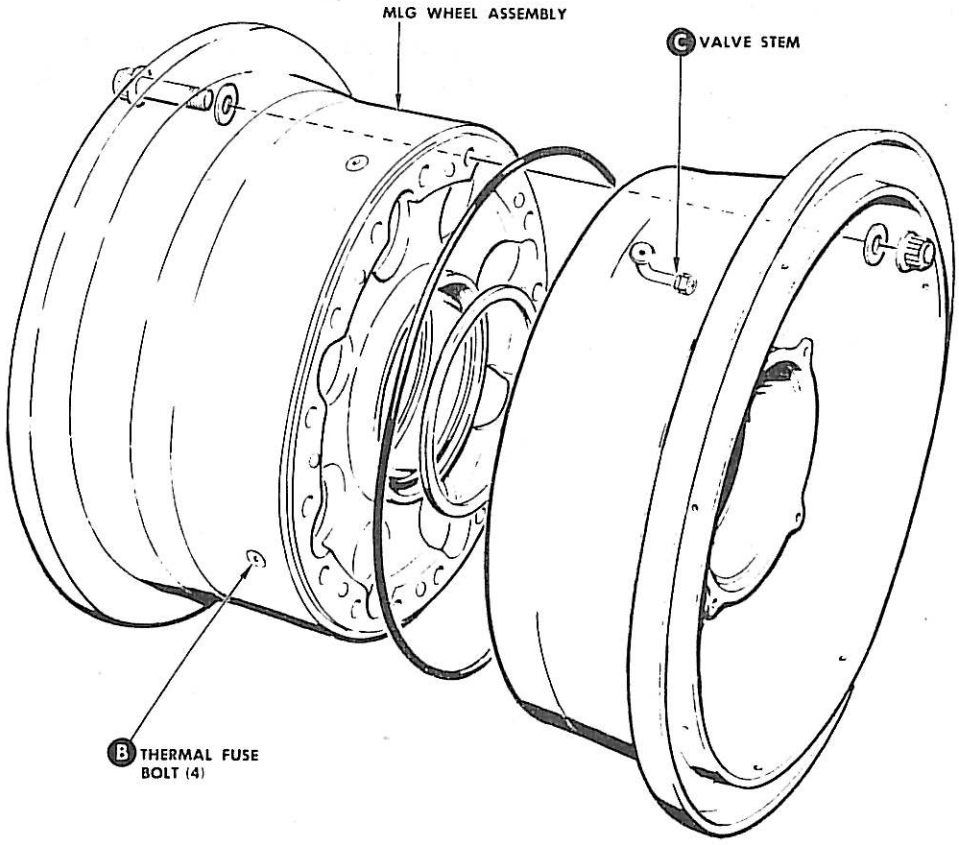
NOTE: Do not allow thermal fuse bolt to turn while torquing nut.

(3) Apply one coat of epoxy primer to head of thermal fuse bolt and adjacent area. Allow primer to dry before mounting tire.

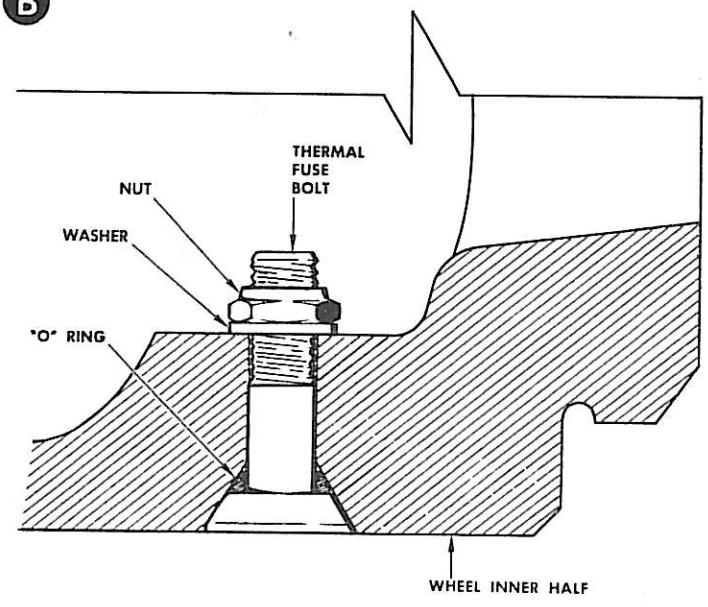
(4) Assemble and install MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

(5) Lower airplane and remove jack (refer to Chapter 7, LIFTING AND SHORING).

A

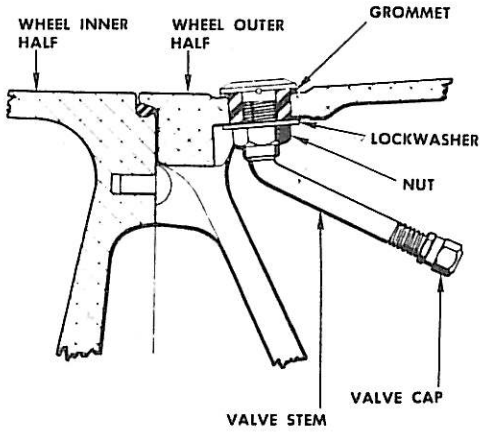


B



THERMAL FUSE BOLT DETAIL

C



PNEUMATIC TIRE VALVE INSTALLATION

30 02 32 050

6. Removal/Installation MLG Wheel Valve Stem Assembly (see Figure 202)

A. Equipment Required. Necessary equipment to remove, disassemble, and install MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

B. Materials Required. Dow Corning Silicone Insulating and Sealing Compound DC-4.

C. Remove MLG Wheel Valve Stem Assembly.

(1) Jack airplane as necessary to remove applicable wheel (refer to Chapter 7, LIFTING AND SHORING).

(2) Remove and disassemble MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

(3) Remove nut and spacer from valve stem; disassemble valve stem from wheel outer half. Discard rubber grommet.

D. Install MLG Wheel Valve Stem Assembly.

(1) Coat new rubber grommet with Dow Corning Silicone Insulating and Sealing Compound DC-4. Install rubber grommet on valve stem.

(2) Insert valve stem into hole in wheel outer half, and install spacer and nut. Torque nut 30 to 50 inch-pounds.

(3) Assemble and install MLG wheel and tire assembly (refer to Removal/Installation MLG Wheels and Tires).

(4) Retorque valve stem nut to 30 to 50 inch-pounds after tire is inflated to operating pressure.

MAIN LANDING GEAR (MLG) HYDRAULIC SYSTEM - DESCRIPTION AND OPERATION

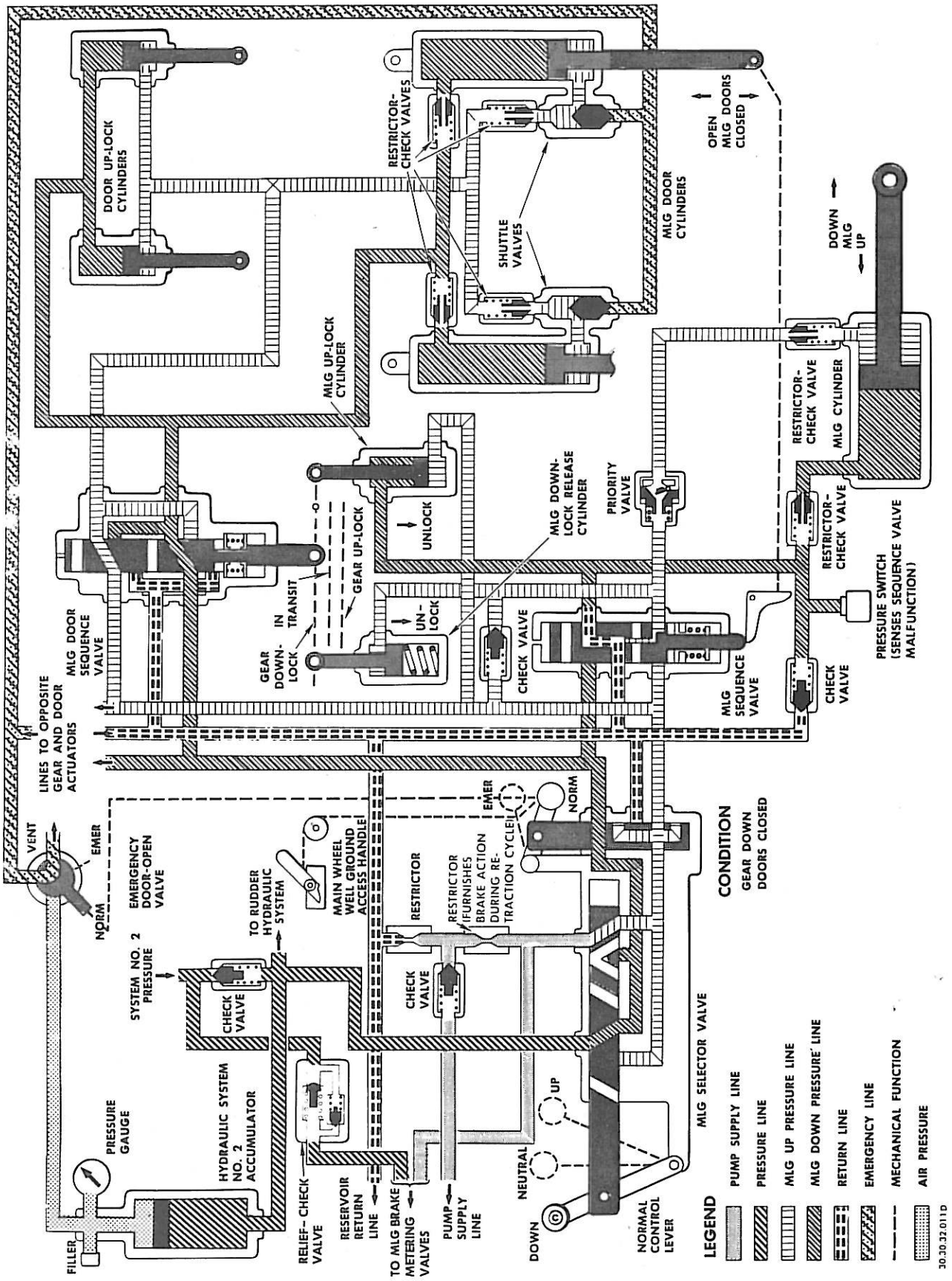
1. General

The main landing gear hydraulic system distributes power from the No. 2 hydraulic system to raise and lower the main landing gear, and open and close the MLG doors; see Figure 1. The system consists of an MLG selector valve, MLG actuating cylinders, MLG door actuating cylinders, MLG sequence valves, MLG door sequence valves, MLG up-lock and down-lock actuating cylinders, and MLG door up-lock actuating cylinders. Priority valves, restrictors, restrictor-check valves and check valves are included to establish the sequence of operations, the speed of operation, or to prevent reverse flow. An emergency door-open valve routes air from the air side of the No. 2 hydraulic system accumulator to the MLG door actuating cylinders during emergency extension of the gear.

2. Operation

Gear retraction starts when the landing gear control lever is placed in the UP position. The following operations then take place: Hydraulic pressure is ported through the door sequence valves to the "open" side of the door up-locks and the door actuating cylinders. The door up-locks unlock and the main gear doors open. As the doors reach the full open position the gear sequence valves actuate and port pressure to the gear down-lock release cylinders and to the "up" side of the gear actuating cylinders. Priority valves delay operation of the gear actuating cylinders to ensure release of the gear down-locks before the gear retracts. As a supplemental action during gear retraction, a restrictor in the pump supply line, downstream of the main gear selector valve, causes a back pressure to build up in the pump supply line. This increased pressure backs up through the main gear brake metering valves and applies the brakes. Thus, the main gear brakes automatically actuate and stop wheel rotation during the retraction cycle. As the gear locks in the up position, the door sequence valves move to the "gear up" position and port hydraulic pressure to the "close" side of the door and door up-lock actuating cylinders; the door up-locks, however, are held open by trigger linkages. The door actuating cylinders close the doors and the door rollers trip the door up-locks, locking the doors closed and completing the gear retraction cycle.

With the gear up and locked and the doors closed and locked, the following sequence takes place when the landing gear control lever is placed in the DOWN position: Hydraulic pressure is ported through the door sequence valves to the "open" side of the door up-locks and the door actuating cylinders. The door up-locks unlock and the main landing gear doors open. As the doors reach the full open position, the gear sequence valves actuate and port hydraulic pressure to the "open" side of the gear up-lock actuating cylinders and to the "down" side of the gear actuating cylinders. As the gear locks in the down position, the door sequence valves move to the "gear down" position and port hydraulic pressure to the "close" side of the door and door up-lock actuating cylinders. The doors close, trip the up-locks, and lock closed to complete the gear extension cycle.



Main Landing Gear
Hydraulic System - Schematic
Figure 1

When the gear emergency release system is employed, the emergency portion of the MLG selector valve, the emergency door-open valve (pneumatic) and all gear and door up-locks are operated mechanically. The MLG doors open pneumatically and the gear extends and locks with only the force of gravity assisted by air loads acting on it. Should pneumatic pressure not be available, the MLG doors will still unlock and allow the gear to extend. Thus, the emergency system is entirely independent of the hydraulic pressure source.

3. Main Landing Gear (MLG) Selector Valve

The MLG selector valve, located on the forward bulkhead of the hydraulic compartment, is actually two valves in one assembly. It contains a selector for normal gear retraction and extension, and a selector for emergency extension; see Figure 1. The selector for normal operation has three positions; UP, NEUTRAL, and DOWN. In the UP position it connects the landing gear "up" lines to the pressure line and the landing gear "down" lines to the pump supply line.

The selector for emergency gear extension provides a separate valve to connect the "up" and "down" lines to the return line and relieve all pressure from the main landing gear hydraulic system. This prevents a hydraulic lock which might interfere with emergency gear extension.

4. Main Landing Gear (MLG) Sequence Valves

A MLG sequence valve in each main wheel well provides the proper main gear operating sequence in relation to the main gear doors. The MGL sequence valves prevent mechanical interference by blocking pressure supplied to the gear actuating cylinders when the doors are closed or in transit. See 32-13-0, Figure 1, for sequence valve location and means of actuation.

Each MLG sequence valve has two positions, and is spring-loaded to the door-open position; see Figure 1. In the door-closed position (actuated), the sequence valve blocks pressure to the MLG up-lock and down-lock cylinders and to the MLG actuating cylinder; it also connects the MLG up-lock and down-lock cylinders and the MLG actuating cylinder to the hydraulic return line.

When the MLG doors are opened, the MLG sequence valve actuates and connects the appropriate pressure and return lines to the gear up-lock and down-lock cylinders and to the MLG actuating cylinder. With the MLG selector valve in the UP position and the doors open, the MLG sequence valve routes pressure to the MLG down-lock release cylinder and to the "up" side of the MLG actuating cylinder. At the same time, the "unlock" side of the MLG up-lock cylinder and the "down" side of the MLG actuating cylinder connect to the pump supply line. In a similar manner, placing the MLG selector valve in the DOWN position ports hydraulic pressure to the "unlock" side of the gear up-lock cylinder and to the "down" side of the MLG actuating cylinder and lowers the landing gear.

A MLG sequence valve sensor switch in each main wheel well, adjacent to the MLG sequence valves, senses "gear down" pressure to the MLG actuating cylinders. If a MLG sequence valve should malfunction or is not positioned properly for gear retraction, the corresponding sensor switch will prevent the landing gear control lever lock solenoid from unlocking the control lever, and will illuminate the LDG TRUCK POS indicator light on the pilots' center instrument panel. Refer to 32-10-0, Figure 1, and 32-12-0, Figure 1, for schematics showing electrical connections to the MLG sequence valve sensor switches.

5. Main Landing Gear (MLG) Door Sequence Valves

A MLG door sequence valve at each main gear up-lock controls movement of the corresponding MLG doors and prevents interference between the landing gear and the doors. The MLG door sequence valves are mechanically linked to the gear up-locks and down-locks to synchronize door movements with gear movements. See 32-1-0, Figure 1, for door sequence valve location and means of actuation.

Each MLG door sequence valve has three positions; gear down and locked, gear in transit, and gear up and locked; see Figure 1. It always come to rest in one of the locked positions, using the transit position only while the landing gear is in transit. In either locked position, the MLG door sequence valve routes hydraulic pressure from the MLG selector valve to the "open" side of the door actuating cylinders. After the doors are open, the MLG sequence valve actuates the appropriate gear up-lock or down-lock release cylinder, according to MLG selector valve position. Movement of the gear up-lock or down-lock places the door sequence valve in the "transit" position. When the gear reaches the opposite lock, the movement of the lock is transmitted to the MLG door sequence valve. The valve then routes pressure to the "close" side of the door actuating cylinders to complete the sequence.

6. Main Landing Gear (MLG) Actuating Cylinders

A MLG actuating cylinder connects between the shock strut and side brace of each main gear to provide an actuating force for landing gear retraction and extension; see Figure 1, and 32-1-0, Figure 1. Each MLG actuating cylinder has a conventional (inner) piston and a floating (outer) piston. The floating piston limits the extension force exerted during the last 0.3-inch travel and prevents excessive side loads on the MLG trunnion braces which hold the shock strut in position. During the extension stroke, hydraulic pressure exerts a force on both the inner and the floating piston, and the force acting on both pistons is transmitted to the piston rod. When the piston rod approaches the last 0.3-inch of travel, the floating piston contacts the end of the cylinder. From that point to the end of the extension stroke, the force exerted on the floating piston is transmitted to the end of the cylinder; only the force acting on the inner piston is transmitted to the piston rod. The floating piston limits forces during the extension stroke only.

Two bleed orifices in the floating piston, 180 degrees apart, provide snubbing action during the retraction stroke. As the floating piston covers the down port near the end of the retraction cycle, return fluid must bleed through the two orifices giving a snubbing action during the last two inches of travel.

7. Main Landing Gear (MLG) Door Actuating Cylinders

Each main landing gear door is operated by two actuating cylinders; see Figure 1. These actuating cylinders supply the actuating force for opening and closing the doors. Hydraulic and pneumatic lines connect through a shuttle valve (an integral part of the actuating cylinder) to the door "open" side of the actuating cylinders, and a hydraulic line is connected to the door "close" side. See 32-13-0, Figure 1, for typical actuating cylinder and attachment to door mechanism.

8. Main Landing Gear (MLG) Priority Valves

A MLG priority valve in the top of each main wheel well insures the proper operating sequence of the landing gear hydraulic system components connected to a common pressure source; see Figure 1. Each MLG priority valve blocks the flow of fluid in one direction until a calibrated pressure is reached. It then opens like a pressure relief valve to permit flow. In the other direction, the MLG priority valves permit unrestricted flow.

9. Main Landing Gear (MLG) Emergency Door-Open Valve

The emergency door-open valve is a spring-loaded, normally open valve located on the forward bulkhead of the hydraulic compartment, above the MLG selector valve. When the landing gear emergency release lever in flight compartment is operated, a cable and pulley arrangement actuates the valve and connects the air side of No. 2 hydraulic system accumulator to the "open" side of the MLG door actuating cylinders. The air pressure, in turn, operates the door actuating cylinders and opens the doors. The valve is reset by releasing and returning the emergency release lever to the "up" position.

MAIN LANDING GEAR (MLG) HYDRAULIC SYSTEM - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. MAIN LANDING GEAR DOOR FAILS TO OPEN	
A. No hydraulic pressure available.	Check No. 2 hydraulic pressure gage on the copilot's instrument panel. If no pressure is indicated, refer to Chapter 29, HYDRAULIC POWER SYSTEMS.
B. Controls to selector valve have not been properly rigged or selector valve defective.	Check the controls to the MLG selector valve for proper rigging; refer to 52-5-0. If valve has been properly rigged and doors do not open, replace selector valve.
C. One door only opens.	Check door sequence valve.
2. MAIN LANDING GEAR DOORS OPEN AND EITHER MAIN GEAR FAILS TO OPERATE	
A. Main gear sequence valve malfunctioning or down-lock release cylinder defective.	Check that MLG sequence valve linkage has released valve plunger. Visually check the main landing gear down-lock. WARNING: BEFORE CHECKING DOWN-LOCK ON MLG JURY BRACE, REDUCE HYDRAULIC SYSTEM PRESSURE TO 500 PSIG TO PREVENT GEAR FROM SUDDENLY RETRACTING. If down-lock is locked and plunger of MLG sequence valve is released, either the sequence valve or the down-lock release cylinder is defective. Replace MLG sequence valve. If, after replacement of sequence valve the down-lock still fails to unlock, replace the down-lock release cylinder.
B. Priority valve or restrictor in pressure line malfunctioning	If, in the preceding check, the down-lock did unlock and the gear failed to retract, reduce hydraulic system pressure to 0 psig and disconnect the pressure line from the MLG actuator. Connect pressure gage (0 to 3000 psig) to pressure line and slowly apply hydraulic pressure. If no pressure is indicated on the pressure line gage after the test stand pressure has

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
2. MAIN LANDING GEAR DOORS OPEN AND EITHER MAIN GEAR FAILS TO OPERATE (CONT)	
	passed 1100 (±50) psig, replace priority valve and restrictor; refer to 32-2-8.
C. Actuator or restrictor in return line defective.	If, after the previous check, the gear still fails to retract, either the actuator or the restrictor in the return line is defective. Disconnect actuator from MLG shock strut and disconnect pressure and return line to actuator. Connect hydraulic hand pump to actuator and test unit. If actuator is defective, replace actuator. If actuator check is good, replace restrictor in return line.
3. MAIN LANDING GEAR UP AND LOCKED AND DOOR FAILS TO CLOSE	
A. Door sequence valve or door actuator cylinder defective.	Check the rigging of door sequence valve; refer to 32-1-0. If sequence valve has been rigged properly, either the door sequence valve or the door actuating cylinders are malfunctioning. Return the gear to the down-and-locked position and install ground safety pins. Reduce hydraulic pressure to 0 psig and replace door sequence valve; refer to 32-2-3. If door still fails to close, replace MLG door actuating cylinders; refer to 32-2-5.

MAIN LANDING GEAR (MLG) HYDRAULIC SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test MLG Hydraulic System - Bleeding Procedure

A. Equipment Required.

(1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering up to 3000 psig at 16 gpm.

NOTE: The hydraulic test unit shall have a metering device to limit gear retraction or extension time to 15 seconds minimum.

(2) External source of 115/200 volt, 3-phase, 400 cps ac electrical power.

(3) Airplane jacking equipment.

(4) Guard rails for main wheel well area.

B. Preparation.

(1) Check that landing gear ground safety pins are installed.

(2) Jack airplane at wing and fuselage jack points until landing gear wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING).

(3) Connect hydraulic test unit to No. 2 hydraulic system and pressurize system (refer to Chapter 29, HYDRAULIC POWER).

(4) Connect and apply external source of ac electrical power to airplane (refer to Chapter 24, ELECTRICAL POWER).

(5) Place guard rails around the main wheel well area.

C. Bleeding Procedure.

NOTE: During MLG hydraulic system bleeding procedure, monitor airplane hydraulic reservoir fluid level and refill if necessary (refer to Chapter 12, SERVICING).

(1) Bleed MLG hydraulic system as follows:

(a) Remove MLG ground safety pins.

(b) Place landing gear normal control lever in the UP position and hold for 10 seconds.

(c) Place landing gear normal control lever in the DOWN position and hold for 10 seconds.

(d) Repeat steps (b) and (c) twenty-five times.

(e) Reinstall MLG ground safety pins.

(2) Bleed MLG brake system as follows:

(a) Depress pilot's or copilot's brake pedals against stops and release. Repeat ten times.

(b) Bleed MLG brakes at bleed valves on brakes (refer to 32-8-0).

D. Conclusion.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING) and disconnect hydraulic test unit from airplane.

(2) Remove external source of ac power from airplane (refer to Chapter 24, ELECTRICAL POWER).

(3) Lower airplane and remove jacks (refer to Chapter 7, LIFTING AND SHORING).

MAIN LANDING GEAR (MLG) SELECTOR VALVE - MAINTENANCE PRACTICES

1. Removal/Installation MLG Selector Valve (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

C. Remove MLG Selector Valve.

(1) Gain access to the MLG selector valve in hydraulic compartment.

(2) Disconnect the emergency door-open valve cable and spring from MLG selector valve emergency (top) lever.

(3) Disconnect the MLG normal control push-pull rod linkage from the MLG selector valve normal (bottom) lever.

(4) Identify and disconnect five hydraulic lines from the selector valve.

(5) Remove four mounting bolts which secure the selector valve to bulkhead; remove valve.

NOTE: Remove fittings from ports of selector valve and hold for installation on replacement valve; discard "O" rings.

D. Install MLG Selector Valve.

(1) Install fittings in ports of replacement selector valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Secure selector valve to forward bulkhead of hydraulic compartment with four mounting bolts. Do not tighten bolts at this time to permit alignment of hydraulic lines with selector valve.

(3) Connect five hydraulic lines to selector valve, as identified in step C.(4). Do not tighten line connections at this time.

(4) Tighten mounting bolts installed in step (2) preceding; tighten hydraulic lines connected in step (3) preceding.

(5) Adjust and connect the emergency door-open valve cable to the selector valve emergency lever (refer to 32-6-0, step 1.C.(7) for adjustment). Install spring between clip on lever and bracket on bulkhead.

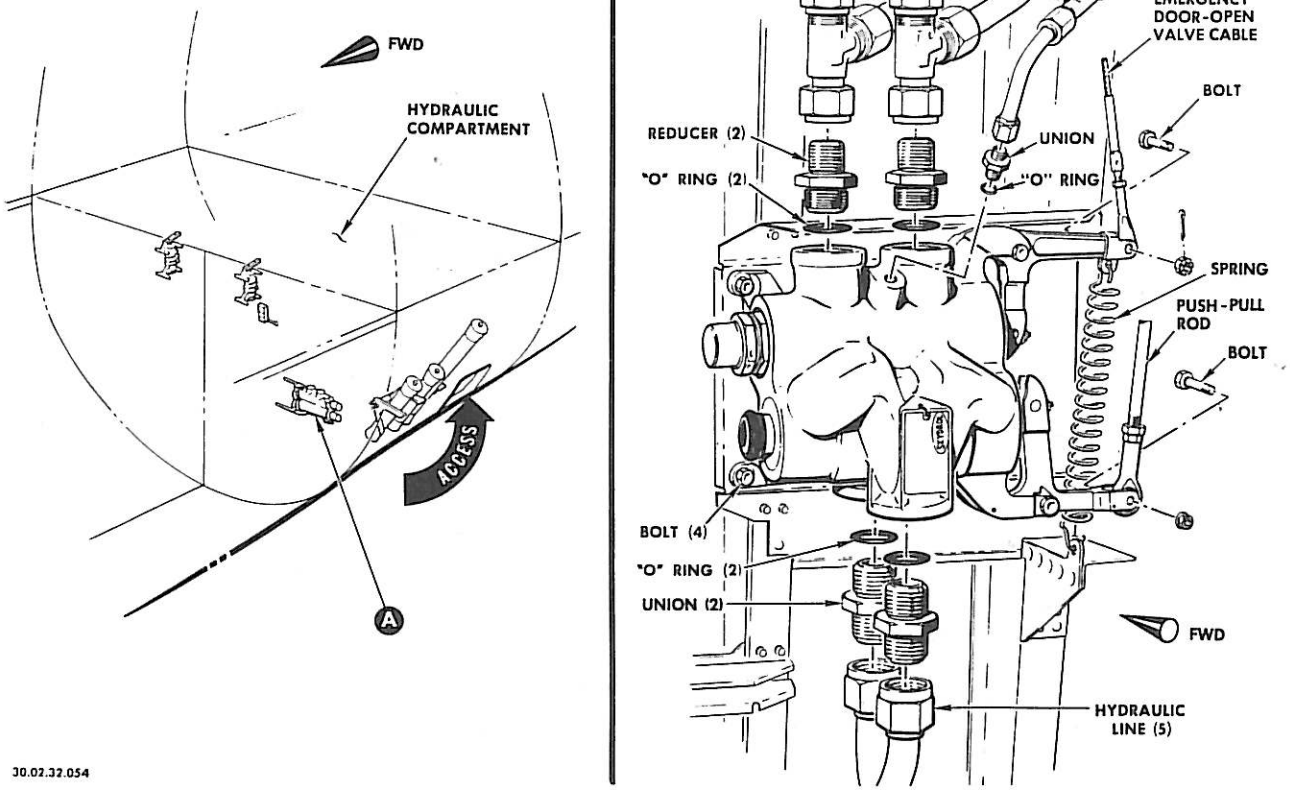
(6) Adjust and connect push-pull rod from the main landing gear normal control system to fork on selector valve normal lever (refer to 32-5-0, steps 1.C.(4), 1.C.(7), 1.C.(11) and 1.C.(12) for adjustment).

(7) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(8) Deleted.

(9) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check selector valve for hydraulic leaks.

NOTE: If only the MLG selector valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.G.(excluding NLG checks), and 2.I.



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Main Landing Gear Selector Valve Installation
Figure 201

MAIN LANDING GEAR (MLG) SEQUENCE VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Sequence Valve (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Sequence Valve.

(1) Identify and disconnect five hydraulic lines from sequence valve.

(2) Remove four mounting bolts which secure sequence valve to mounting bracket on interwell web; remove sequence valve.

NOTE: Remove fittings from ports of sequence valve and hold for installation on replacement valve; discard "O" rings.

D. Install MLG Sequence Valve.

(1) Install fittings in ports of replacement sequence valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Install sequence valve on mounting bracket, on interwell web, with four mounting bolts. Do not tighten bolts at this time, to permit alignment of hydraulic lines with valve.

(3) Connect five hydraulic lines to sequence valve, as identified in step C.(1). Do not tighten connections at this time.

(4) Tighten mounting bolts installed in step (2), preceding; tighten hydraulic lines connected in step (3), preceding.

(5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(6) Adjust sequence valve linkage (refer to 32-13-0, step 1.C.(5)(b) thru 1.C.(5)(b) 4)).

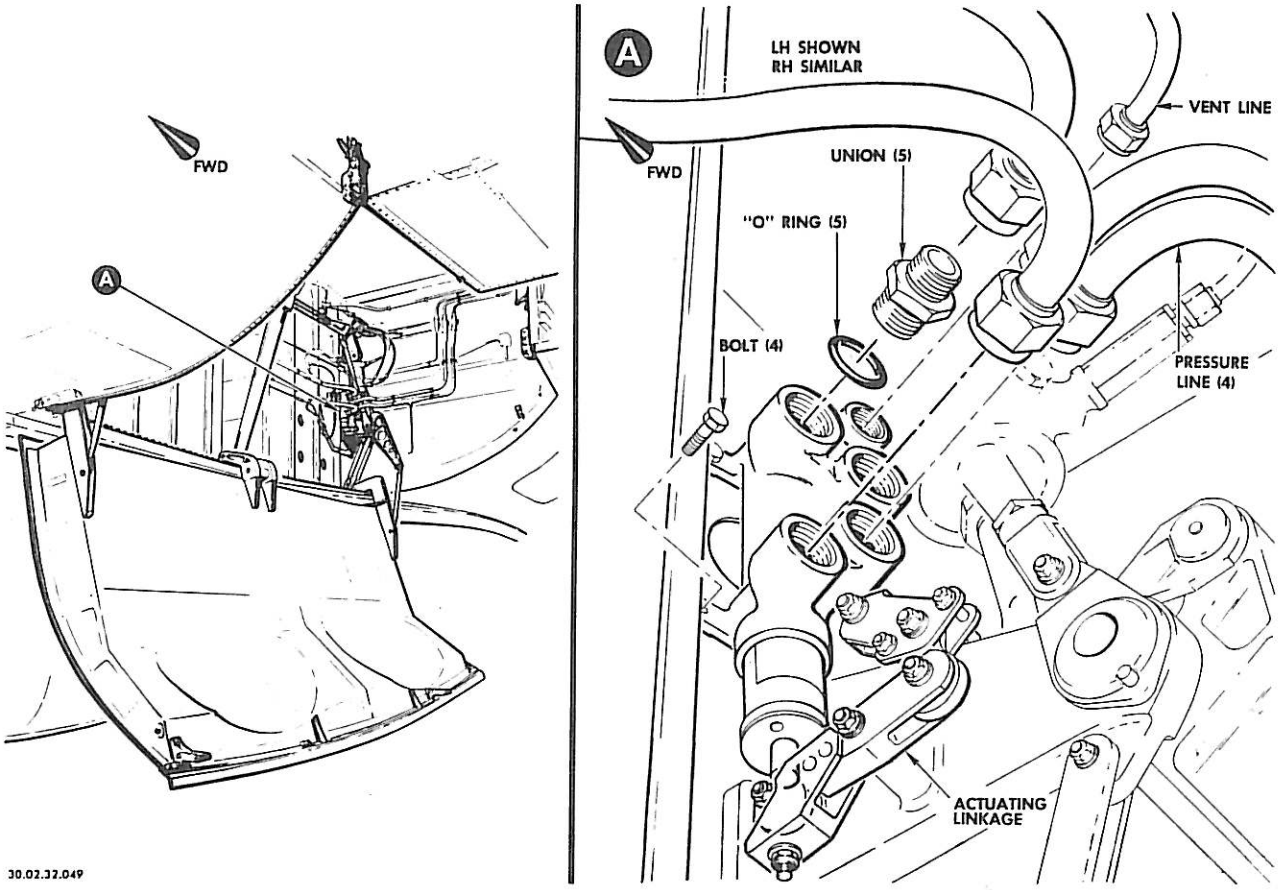
(7) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(8) Close MLG doors and return ground access handle to normal (forward) position.

(9) Deleted.

(10) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check sequence valve for hydraulic leaks.

NOTE: If only an MLG sequence valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



(8) Close MLG doors and return ground access handle to normal (forward) position.

(9) Bleed main landing gear hydraulic system (refer to 32-2-0) and check sequence valve for leaks.

(10) Perform landing gear operational check (refer to 32-0).

MAIN LANDING GEAR (MLG) DOOR SEQUENCE VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Sequence Valve (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Door Sequence Valve.

(1) Remove cotter pin, nut, washers, and bolt securing link to fork on sequence valve; disconnect link.

(2) Identify and disconnect five hydraulic lines from sequence valve.

(3) Remove four mounting bolts and nuts securing sequence valve to mounting bracket, in top of MLG wheel well; remove MLG door sequence valve.

NOTE: Remove fittings from ports of sequence valve and hold for installation on replacement valve; discard "O" rings.

D. Install MLG Door Sequence Valve.

(1) Install fittings in ports of replacement sequence valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation).

(2) Install sequence valve on mounting bracket with four mounting bolts and nuts. Do not tighten bolts at this time, to permit alignment of the hydraulic lines with the valve.

(3) Connect five hydraulic lines to sequence valve, as identified in step C.(2); do not tighten connections at this time.

(4) Tighten four mounting bolts installed in step (2), preceding; tighten hydraulic lines connected in step (3), preceding.

(5) Deleted.

(6) Adjust MLG door sequence valve linkage (refer to 32-1-0, step 2.D. (7)).

NOTE: Link is connected to sequence valve fork during adjustment.

(7) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

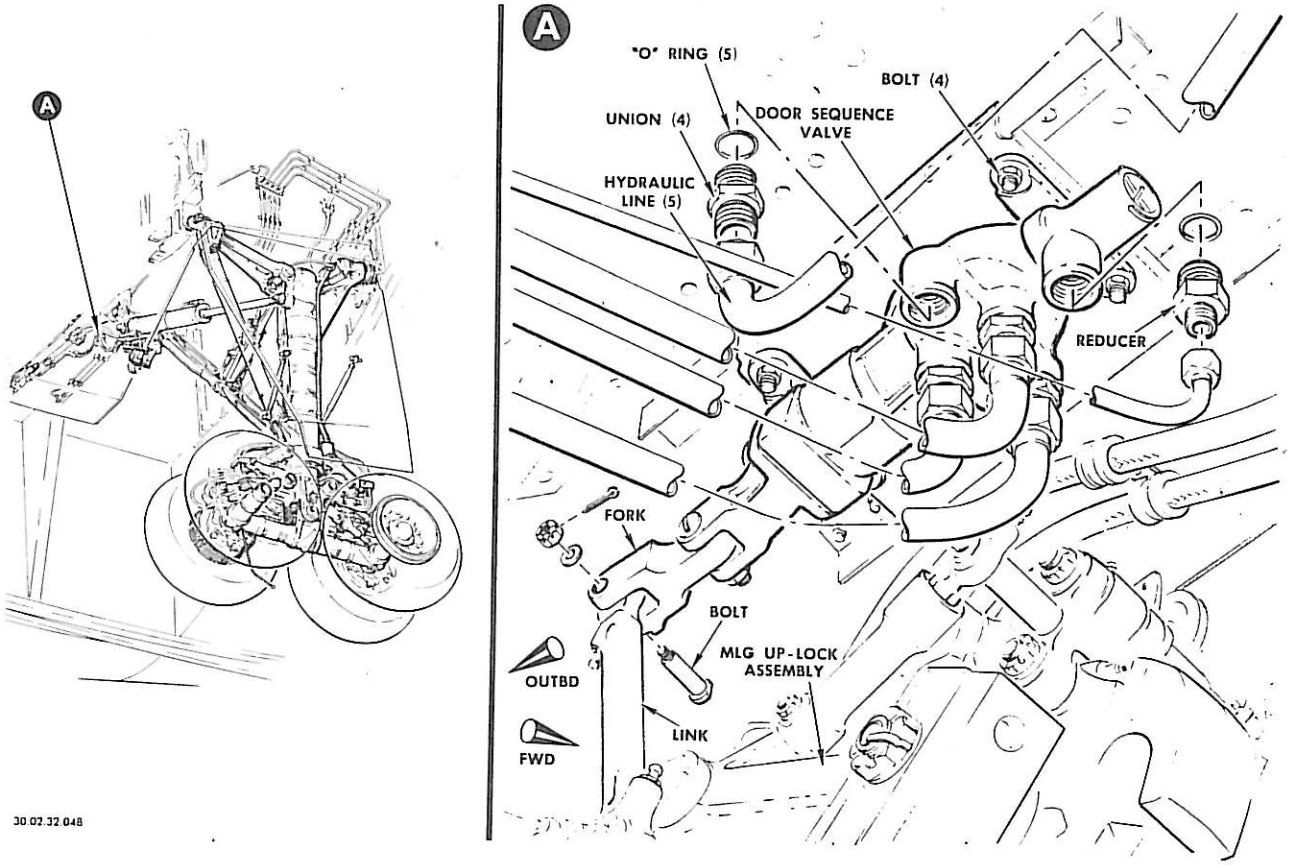
(8) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(9) Close MLG doors and return ground access handle to normal (forward) position.

(10) Deleted.

(11) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check door sequence valve for hydraulic leaks.

NOTE: If only an MLG door sequence valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



Main Landing Gear Door Sequence Valve Installation
Figure 201

MAIN LANDING GEAR (MLG) ACTUATING CYLINDERS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Actuating Cylinder (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Actuating Cylinder.

(1) Identify and disconnect two hydraulic lines at actuating cylinder.

(2) Remove cotter pin, nut, and washer securing actuating cylinder rod to the landing gear shock strut.

(3) Remove cotter pin, nut, and bolt attaching actuating cylinder to universal at upper side brace; remove cylinder.

NOTE: Remove tubing, restrictor-check valve, and fittings from actuating cylinder and hold for installation on replacement cylinder; discard "O" rings.

D. Install MLG Actuating Cylinder.

(1) Install fittings, restrictor-check valve (free flow towards gear up side of actuating cylinder), and tubing on replacement actuating cylinder. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Align actuating cylinder with universal fitting on upper side brace; install bolt and nut. Torque nut 50 (±5) inch-pounds and secure with cotter pin.

NOTE: Install actuating cylinder with hydraulic connections on under side of cylinder. For cotter pin alignment, back off nut to first castellation.

(3) Temporarily connect actuating rod of cylinder to the landing gear shock strut attachment fitting with washers and nut. Secure nut with cotter pin following adjustment in step D.(8).

(4) Connect hydraulic lines to the actuating cylinder, as identified in step C.(1).

(5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(6) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

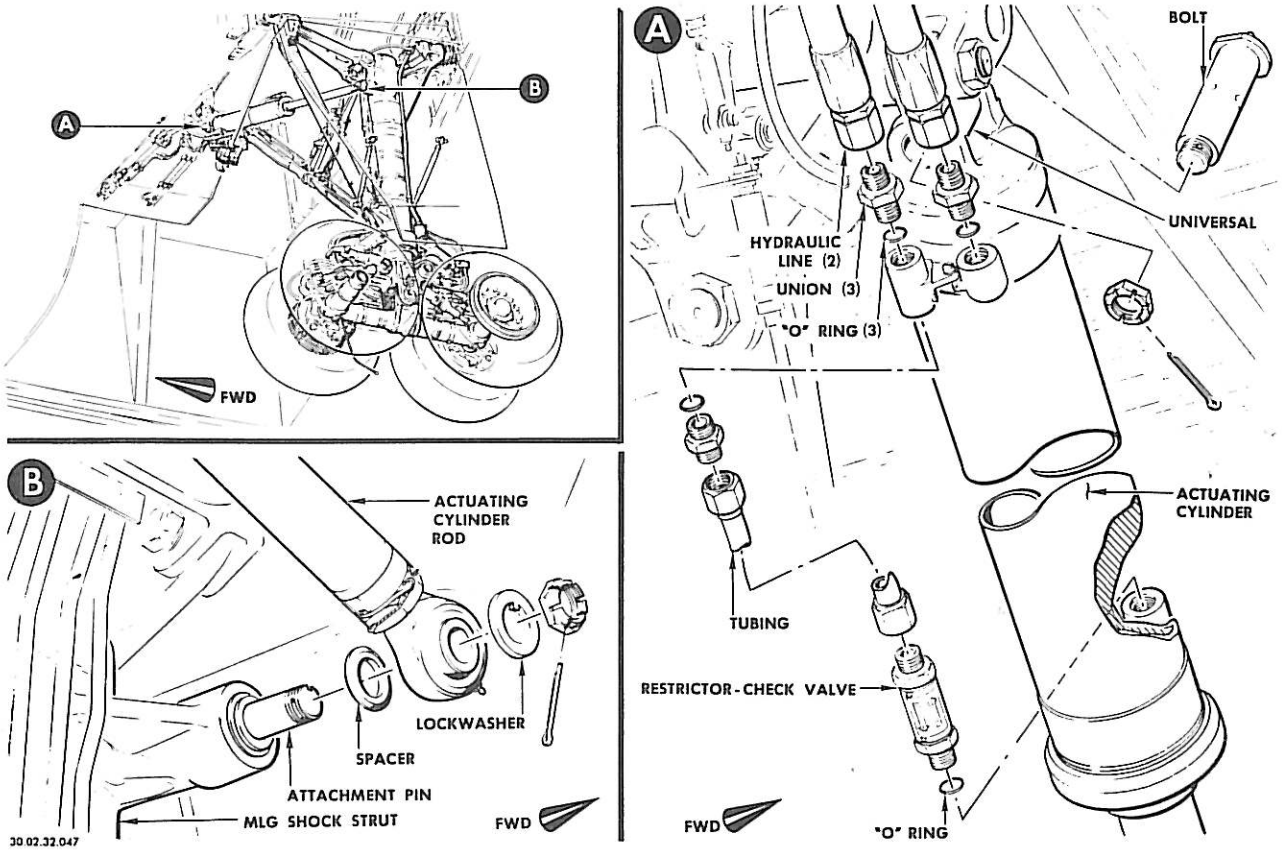
(7) Close MLG doors and return ground access handle to normal (forward) position.

(8) Adjust actuating cylinder overtravel (refer to 32-1-0, steps 2.C.(2) and 2.D.(8) thru 2.D.(10)).

(9) Deleted.

(10) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check actuating cylinder for hydraulic leaks.

NOTE: If only the MLG actuating cylinder has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



Main Landing Gear Actuating Cylinder Installation
Figure 201

MAIN LANDING GEAR (MLG) DOOR ACTUATING CYLINDERS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Actuating Cylinder (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Door Actuating Cylinder.

(1) Identify and disconnect three lines (two hydraulic and one pneumatic) from the actuating cylinder.

(2) Remove cotter pin, nut, washer, and bolt connecting actuating cylinder to door mechanism toggle links.

(3) Remove pin, nut, washer(s) and bolt attaching actuating cylinder to bracket on interwell web; remove actuating cylinder.

NOTE: Remove restrictor-check valve and fittings from ports of actuating cylinder and hold for installation on replacement cylinder; discard "O" rings.

D. Install MLG Door Actuating Cylinder.

(1) Install restrictor-check valve (restricted flow towards door open side of actuating cylinder) and fittings in ports of replacement actuating cylinder. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Align actuating cylinder with upper support bracket and install bolt, washer(s) and nut. Secure nut with cotter pin.

NOTE: When installing MLG right-hand door aft actuating cylinder, install Teflon washer on upper attachment bolt, between aft lug of support bracket and actuating cylinder.

(3) Temporarily connect the rod end of actuating cylinder to the door mechanism toggle links with bolt, washer, and nut. Secure nut with cotter pin following adjustment in step D.(5).

(4) Connect three lines (two hydraulic and one pneumatic) to the actuating cylinder, as identified in step C.(1).

(5) Adjust actuating cylinder overtravel (refer to 32-13-0, step 1.C.(5)).

(6) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

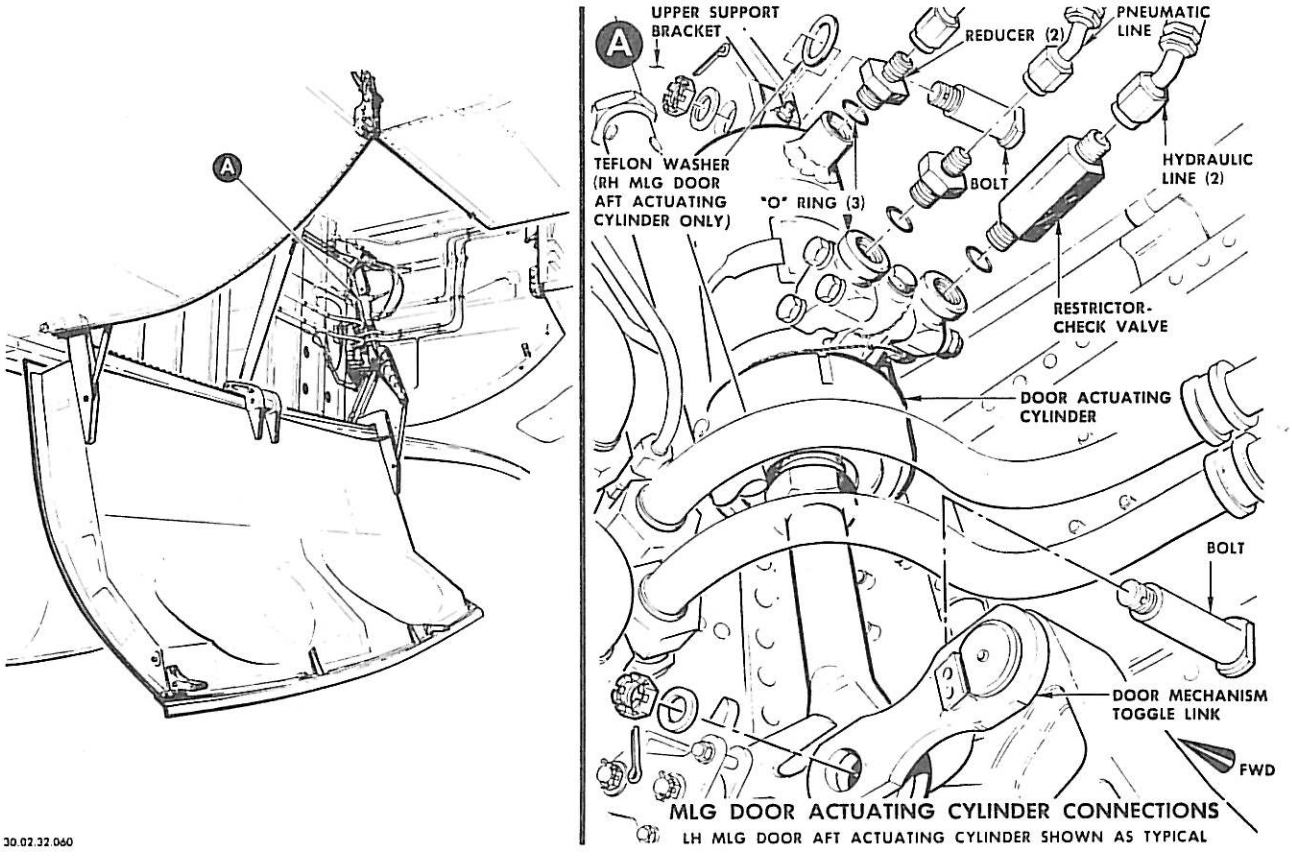
(7) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(8) Close MLG doors and return ground access handle to normal (forward) position.

(9) Deleted.

(10) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check actuating cylinder for hydraulic leaks.

NOTE: If only an MLG door actuating cylinder has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



MLG DOOR ACTUATING CYLINDER CONNECTIONS
LH MLG DOOR AFT ACTUATING CYLINDER SHOWN AS TYPICAL

Main Landing Gear Door Actuating Cylinder Installation
Figure 201

MAIN LANDING GEAR (MLG) DOWN-LOCK RELEASE CYLINDERS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Down-Lock Release Cylinder (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

C. Remove Down-Lock Release Cylinder.

(1) Disconnect hydraulic line from release cylinder.

(2) Remove cotter pins, nuts, washers, and bolts securing down-lock release cylinder to the MLG side brace and jury brace; remove release cylinder.

NOTE: Remove fitting from port of down-lock release cylinder and hold for installation on replacement cylinder; discard "O" ring.

D. Install Down-Lock Release Cylinder.

(1) Install fitting in port of replacement release cylinder. Use new "O" ring for installation. ("O" ring must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Bottom out actuating cylinder piston in the retracted position. Adjust release cylinder rod end to obtain 9.590-inch dimension between cylinder bearing centers. Tighten rod end jam nut and safety-wire.

(3) Attach down-lock release cylinder to MLG side brace with bolt, washer, and nut. Secure nut with cotter pin.

NOTE: Cylinder end of release cylinder shall be attached to the MLG side brace.

(4) Connect piston rod end to down-lock latch with bolt, washer, and nut. Secure nut with cotter pin.

(5) Connect hydraulic line to down-lock release cylinder.

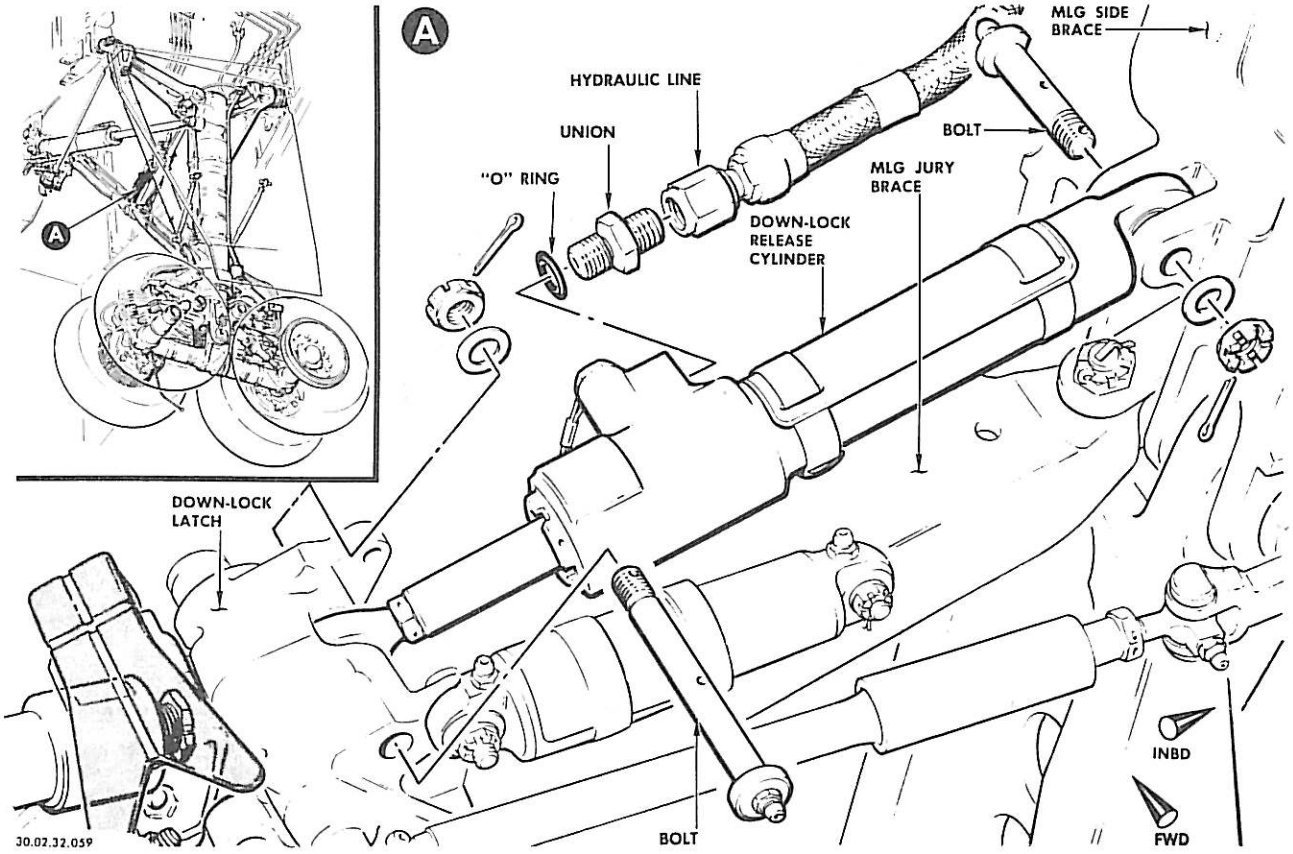
(6) Check MLG jury brace adjustment (refer to 32-1-0, step 2.D.(2)).

(7) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(8) Deleted.

(9) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check cylinder for hydraulic leaks.

NOTE: If only the MLG down-lock release cylinder has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



Main Landing Gear Down-Lock Release Cylinder Installation
Figure 201

MAIN LANDING GEAR (MLG) UP-LOCK ACTUATING CYLINDERS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Up-Lock Actuating Cylinder (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG up-locks; manually open MLG doors.

C. Remove Up-Lock Actuating Cylinder.

(1) Remove up-lock assembly from the MLG side brace (refer to 32-1-2).

(2) Remove cotter pin, nut, washer, and bolt attaching emergency release lever and actuator link to up-lock housing.

(3) Remove cotter pins, nuts, washers, and bolts securing up-lock actuating cylinder to up-lock housing and actuator link; remove actuating cylinder.

NOTE: Remove fittings from ports of up-lock actuating cylinder and hold for installation on replacement actuating cylinder; discard "O" rings.

D. Install Up-Lock Actuating Cylinder.

(1) Install fittings in ports of replacement actuating cylinder. Use new "O" rings. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Bottom out actuating cylinder in fully extended position. Adjust cylinder rod end to obtain 6.052-inch dimension between bearing centers. Tighten rod end jam nut and safety-wire.

(3) Connect piston rod end to actuator link with bolt, washer, and nut. Secure nut with cotter pin.

(4) Connect cylinder end of actuating cylinder to MLG up-lock housing with bolt, special washers, washer, and nut. Secure nut with cotter pin.

NOTE: Special washers must be installed at each side of actuating cylinder bearing with curved sides facing bearing.

(5) Connect actuator link emergency release lever to up-lock housing with bolt, washer, and nut. Secure nut with cotter pin.

(6) Install up-lock assembly on MLG side brace (refer to 32-1-2).

(7) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

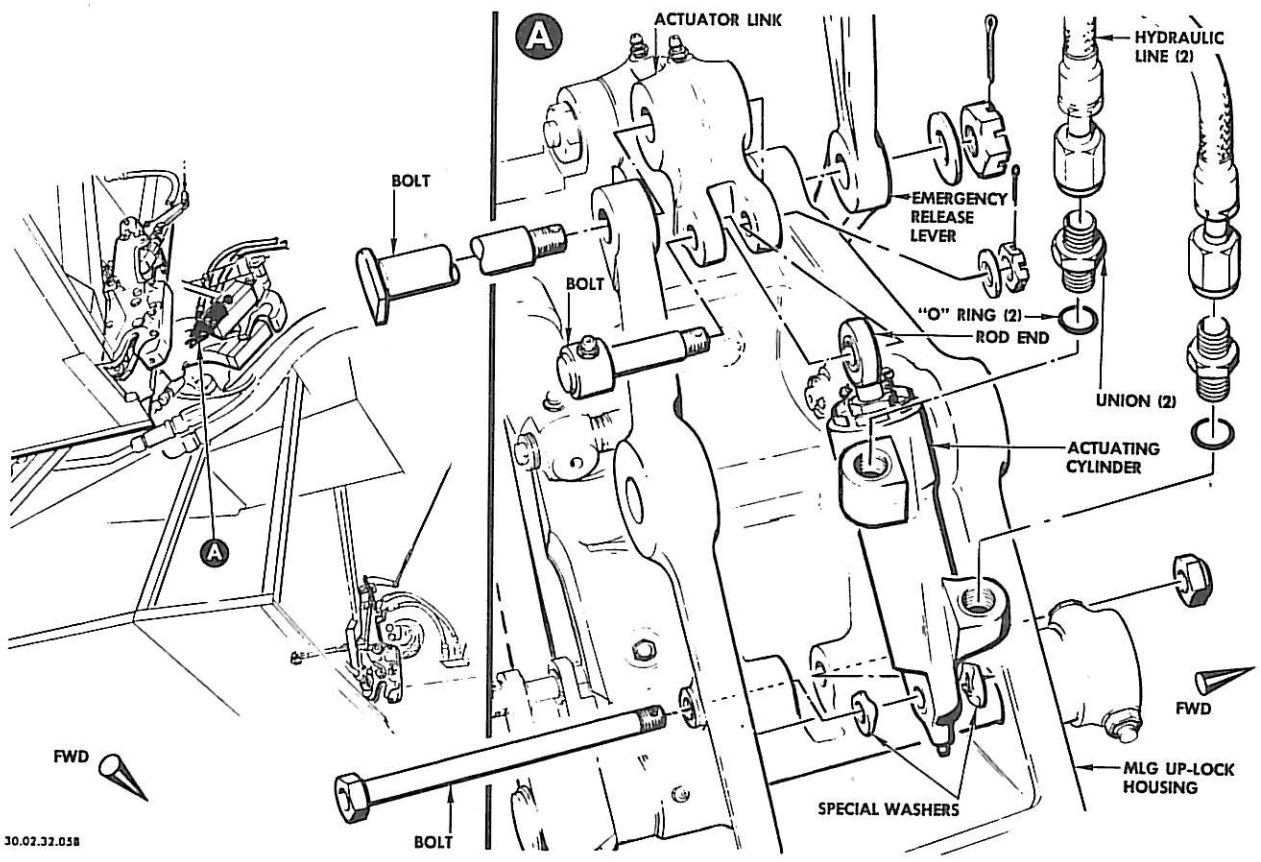
(8) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(9) Close MLG doors and return ground access handle to normal (forward) position.

(10) Check MLG up-lock and door sequence valve adjustments (refer to 32-1-0, steps 2.C.(2), 2.C.(6), 2.D.(3), 2.D.(7), and 2.D.(11) thru 2.D.(16)).

(11) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check cylinder for hydraulic leaks.

NOTE: If only the MLG up-lock actuating cylinder has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



Main Landing Gear Up-Lock Actuating Cylinder Installation
Figure 201

MAIN LANDING GEAR (MLG) PRIORITY VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Priority Valve (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

(3) Check that landing gear ground safety pins are installed.

(4) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Priority Valve.

(1) Gain access to priority valve in top of MLG wheel well.

(2) Identify and disconnect two hydraulic lines (one at inboard end of priority valve and one at outboard end).

(3) Remove clamp which secures priority valve to roof of wheel well; remove priority valve.

NOTE: Remove fittings from ports of priority valve and hold for installation on replacement valve; discard "O" rings.

D. Install MLG Priority Valve.

(1) Install fittings in ports of replacement priority valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Position the priority valve on roof of wheel well with FREE FLOW arrow pointing inboard and secure with retaining clamp.

(3) Connect two hydraulic lines to valve assembly, as identified in step C.(2).

(4) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

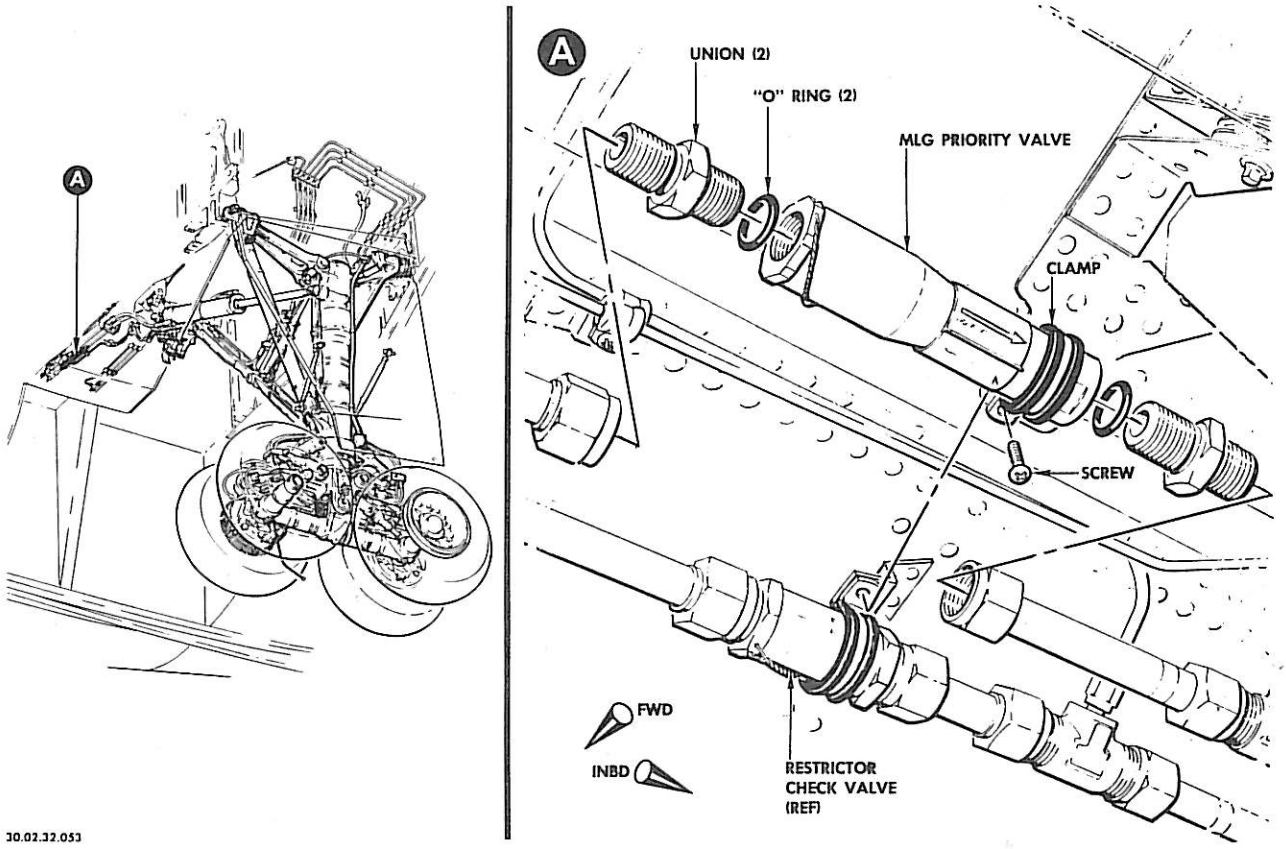
(5) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(6) Close MLG doors and return ground access handle to normal (forward) position.

(7) Deleted.

(8) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0), and check priority valve for hydraulic leaks.

NOTE: If only the MLG priority valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.E.(2) thru 2.E.(15) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



Main Landing Gear Priority Valve Installation
Figure 201

MAIN LANDING GEAR (MLG) EMERGENCY DOOR-OPEN VALVE - MAINTENANCE PRACTICES

1. Removal/Installation MLG Emergency Door-Open Valve (see Figure 201)

A. Equipment Required - None.

B. Materials Required. Bubble Fluid, Specification MIL-L-25567.

C. Preparation.

(1) Relieve air pressure from the No. 2 hydraulic system accumulator (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

D. Remove MLG Emergency Door-Open Valve.

(1) Gain access to the emergency door-open valve through the hydraulic compartment door. The valve is mounted on the forward bulkhead of compartment, slightly inboard and above the MLG selector valve.

(2) Identify and disconnect three pneumatic lines from the valve.

(3) Disconnect cables from the door-open valve actuating lever.

(4) Remove three mounting bolts securing valve to support bracket and remove valve.

NOTE: Remove fittings from ports of valve and hold for installation on replacement valve; discard "O" rings.

E. Install MLG Emergency Door-Open Valve.

(1) Install fittings in ports of replacement valve. Use new "O" rings for installation.

(2) Secure emergency door-open valve to support bracket with three mounting bolts. Do not tighten mounting bolts at this time to permit alignment of pneumatic lines with valve.

(3) Connect three pneumatic lines to valve, as identified in step D.(2). Do not tighten line connections at this time.

(4) Tighten mounting bolts installed in step (2) preceding; tighten pneumatic lines installed in step (3) preceding.

(5) Adjust and connect cables to the emergency door-open valve actuating lever (refer to 32-6-0, step 1.C.(7) for adjustment).

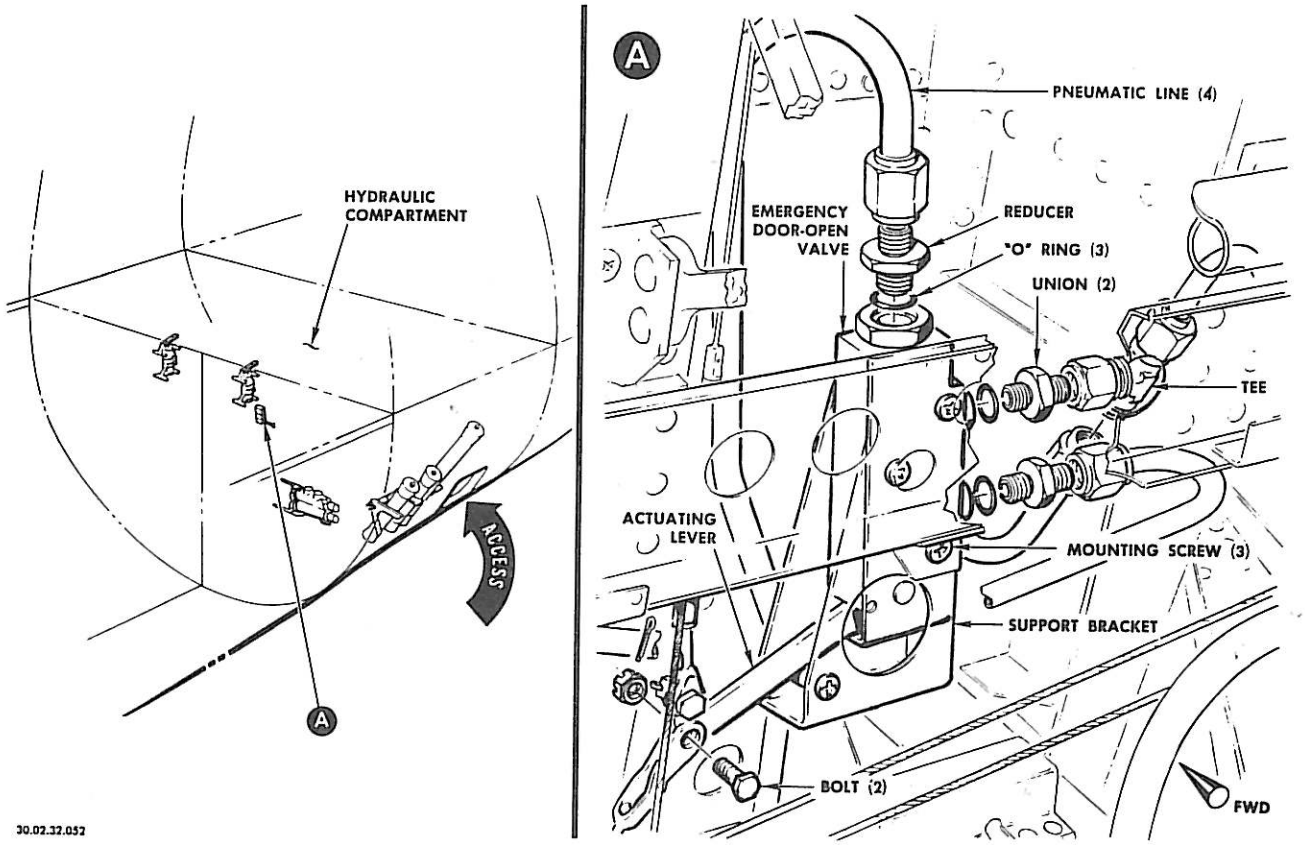
NOTE: Bolts must be free to rotate; secure nuts with cotter pins.

(6) Charge the No. 2 hydraulic system accumulator with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(7) Check emergency door-open valve for leaks with bubble fluid, Specification MIL-L-25567. When test results are satisfactory, remove bubble fluid residue with a clean water-dampened cloth.

(8) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

NOTE: If only the MLG emergency door-open valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.G. (excluding NLG checks), and 2.I.



Main Landing Gear Emergency Door-Open Valve Installation
Figure 201

NOSE LANDING GEAR (NLG) - DESCRIPTION AND OPERATION

1. General

The nose landing gear consists of a shock strut assembly, two wheel assemblies, a drag brace assembly, jury brace, and a hydraulic actuating cylinder; see Figure 1. A nose wheel steering unit and skid detector also mount on the shock strut. The wheel assemblies include the tires and brakes. The drag brace assembly and jury brace hold the landing gear in the extended and/or retracted positions, with the jury brace supporting the nose landing gear down-lock and up-lock mechanism.

Pressure lubrication fittings are provided at all points where moving parts are subject to friction and wear. A single jacking point is located below the skid detector. Cups on each end of the axle permit the connection of a tow bar.

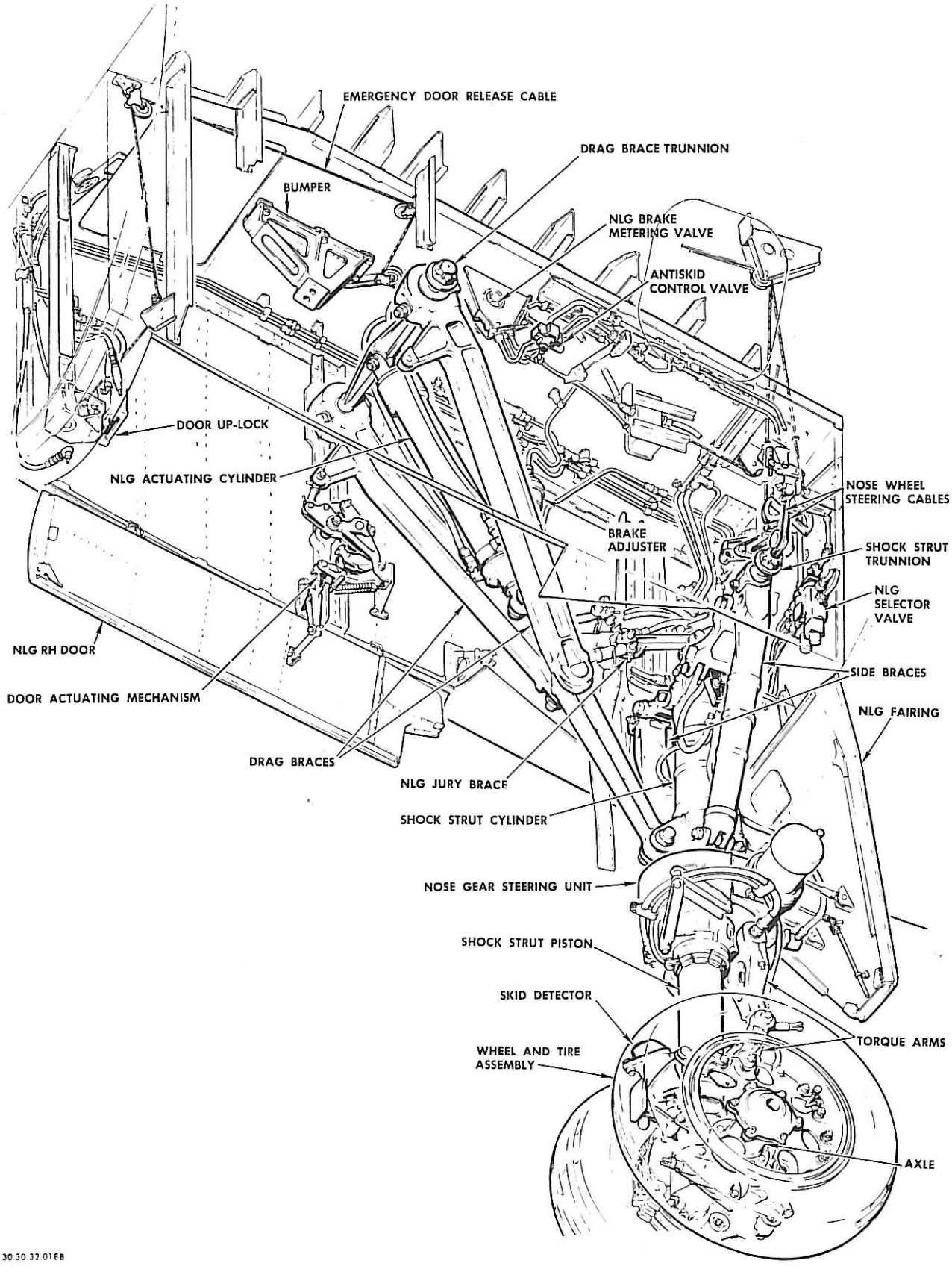
The nose wheels have three inches of caster to ensure proper alignment with the direction in which the airplane is moving. When the shock strut is fully extended, a centering cam locks the wheels in the straight ahead position; thus, when the airplane takes off, the wheels are automatically centered to ensure a proper fit into the wheel wells. The cam also holds the wheels in the center position for landing. When the shock strut is compressed by the weight of the airplane, the wheels are again free for steering. Caution must be observed in towing operations to ensure that the strut is not fully extended; otherwise, attempting to turn the airplane with the centering cams engaged may damage the assembly.

Before towing with a tow bar, it is necessary to disconnect the torque arm links. Quick-disconnect fittings on the shock strut torque arms permit unrestricted steering; however, before towing at extreme angles, the electrical and hydraulic lines should be disconnected.

Retraction of the nose landing gear is accomplished by a hydraulic actuating cylinder connected between the center of the drag brace trunnion and the jury brace assembly; see Figure 1. After the cylinder disengages the down-lock, further extension forces the drag brace assembly and jury brace to fold. The resulting motion retracts the gear forward and up into the wheel well. At approximately the half-way point of the gear retraction cycle, the jury brace again starts to unfold and locks the gear up.

Nose wheel steering is provided by a hydraulically actuated unit mounted on the shock strut cylinder. When actuated, it rotates the shock strut piston which turns the wheels for directional control. Refer to 32-7-0 for description and operation of the nose wheel steering system.

A grounding lug is also provided near the lower end of the NLG drag brace for grounding purposes. This lug should always be used when grounding the airplane to prevent damaging the landing gear finish.


EMERGENCY DOOR RELEASE CABLE
DRAG BRACE TRUNNION
BUMPER
NLG BRAKE METERING VALVE
ANTISKID CONTROL VALVE
DOOR UP-LOCK
NLG ACTUATING CYLINDER
NOSE WHEEL STEERING CABLES
BRAKE ADJUSTER
SHOCK STRUT TRUNNION
NLG SELECTOR VALVE
NLG RH DOOR
SIDE BRACES
DOOR ACTUATING MECHANISM
NLG FAIRING
DRAG BRACES
NLG JURY BRACE
SHOCK STRUT CYLINDER
NOSE GEAR STEERING UNIT
SHOCK STRUT PISTON
SKID DETECTOR
TORQUE ARMS
WHEEL AND TIRE ASSEMBLY
AXLE
30.30.32.01FB

2. Nose Landing Gear (NLG) Shock Strut Assembly

The NLG shock strut is a conventional hydraulic-pneumatic cylinder and piston assembly, using hydraulic fluid and compressed air to absorb shock. A variable section metering pin and an orifice support tube within the strut controls rate of strut compression by restricting hydraulic fluid flow. The strut also incorporates snubbing on the extension stroke, to eliminate hammering during taxiing. The shock strut cylinder and piston are machined tubular forgings that have been shotpeened for stress relief in the critical areas. The upper portion of the shock strut cylinder is connected through two side braces and two trunnion assemblies to the fuselage structure; see Figure 1. The attaching points pivot to permit gear retraction. A filler plug and an air valve are located at the top of the shock strut cylinder. The filler plug can be used to drain the shock strut when the gear is in the retracted position.

The nose wheel steering unit is fixed on the lower end of the shock strut cylinder. Steering movements are transmitted through the torque arms and the shock strut piston to the wheels mounted on an axle housing (outer axle) at the lower end of the shock strut piston. The axle housing carries all the bending loads from the wheels; an inner axle connects the NLG wheels together and carries torsional loads. The inner axle also drives the NLG skid detector.

3. Nose Landing Gear (NLG) Drag Brace

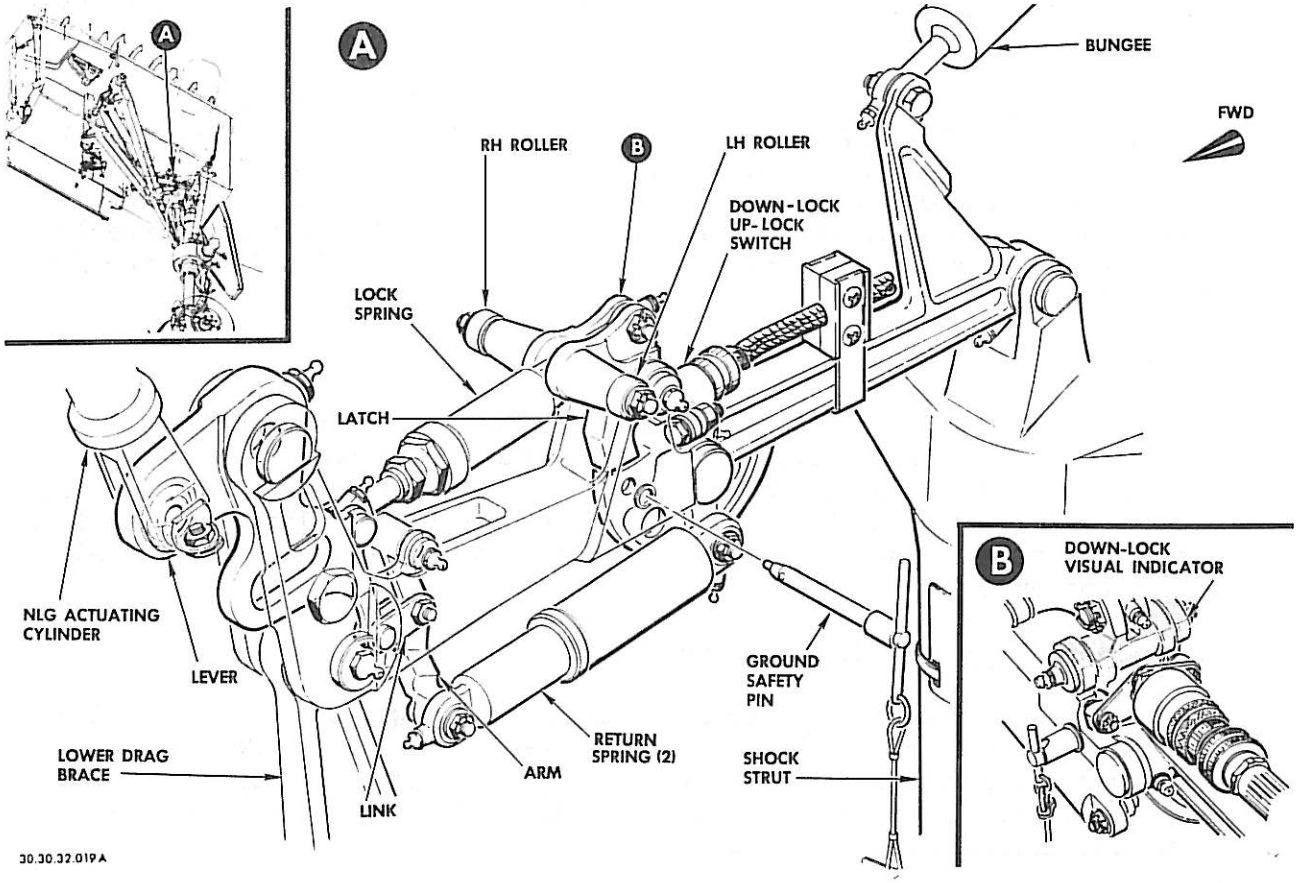
The NLG drag brace consists of three modified "I" beam forgings and a trunnion. The trunnion attaches to each side of the nose wheel well and supports the upper end of the drag brace. The lower end of the drag brace attaches to the shock strut cylinder. The drag brace folds near the middle to permit gear retraction and is locked in both the extended and folded positions by a jury brace.

4. Nose Landing Gear (NLG) Jury Brace

The NLG retracting linkage incorporates a jury brace assembly with a locking mechanism located at its knuckle joint; see Figure 2. The forward end of the jury brace attaches to the drag brace at the knuckle joint and the aft end to the top of the shock strut. The NLG jury brace locks the gear in both the extended and retracted positions.

5. Nose Landing Gear (NLG) Bungee Spring

A bungee spring is installed at the upper end of the NLG shock strut, between a horn on the jury brace and the nose wheel well aft bulkhead. The bungee spring acts as an assist to lock the NLG jury brace in the down position when gear is extended.


A
A
BUNGEE
FWD
RH ROLLER
B
LH ROLLER
DOWN-LOCK
UP-LOCK
SWITCH
LOCK
SPRING
LATCH
NLG ACTUATING
CYLINDER
LEVER
LOWER DRAG
BRACE
LINK
ARM
RETURN
SPRING (2)
GROUND
SAFETY
PIN
SHOCK
STRUT
B
DOWN-LOCK
VISUAL INDICATOR
30.30.32.019A

6. Nose Landing Gear (NLG) Wheels and Tires

The nose landing gear incorporates dual wheels with 29 x 7.7 Type VII, 16 ply rating tubeless tires. The wheels and wheel bearings are mounted on an axle housing (outer axle) that is forged integral with the strut piston. The wheels are splined to an interconnecting inner axle which causes the wheels to rotate together. The inner axle functions also to gear-drive the wheel antiskid mechanism, housed in the lower portion of the strut piston.

The split-type wheels consist of an inner and outer section, made airtight for use with tubeless tires by an "O" ring seal between the two sections. A flange around the perimeter of the inner wheel section has bolted-on keys which insert into keyways on the brake assembly rotor segments. Fuse bolts are installed at four places in each nose wheel to prevent wheel damage because of tire over-heating. Each fuse bolt contains a metal core which will melt and relieve tire pressure if excessive braking overheats the wheel assembly. The fuse bolts reduce the possibility of injury to service personnel from a tire blowout.

NOSE LANDING GEAR - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. NOSE LANDING GEAR RETRACTS TOO SLOWLY OR NOT AT ALL	
A. Insufficient hydraulic pressure No. 1 system.	Check the No. 1 hydraulic system reservoir to see if the fluid level is at the proper full mark. If fluid is low, refer to Chapter 12 for servicing the hydraulic system.
B. Relief valve leaking.	Check relief valve. If leaking, replace.
C. Restrictor check valve improperly installed.	Check the flow direction arrow on restrictor check valve. If arrow is not pointing in direction of flow, reverse restrictor check valve.
D. NLG Actuating cylinder malfunctioning.	Check the nose gear actuating cylinder for internal leakage by trying to manually move nose gear when gear is in the unlocked position. Replace nose gear actuating cylinder or internal piston seals, if necessary.
E. Mechanical linkage to nose landing gear selector valve is out of adjustment.	Check the rigging to determine if selector valve is being actuated to gear up. Rerig mechanical linkage if necessary (refer to 32-5-0).
F. Nose landing gear binding.	Check for proper clearance at each end of nose landing gear trunnion. Readjust nose landing gear.
G. Nose landing gear drag brace binding.	Check for proper clearance of the drag brace. Readjust drag brace if necessary.
2. NOSE GEAR RETRACTS INTERMITTENTLY DURING RETRACTION CYCLE	
A. Air in hydraulic system.	Check No. 1 hydraulic system pressure gage for fluctuation during retraction cycle. Bleed hydraulic system if gage fluctuates (refer to Chapter 29 for bleeding the hydraulic system).
B. Jury brace locking mechanism not properly adjusted.	Check adjustment of jury brace locking mechanism. Adjust if necessary.

NOSE LANDING GEAR (NLG) - MAINTENANCE PRACTICES

1. Servicing Nose Landing Gear (refer to Chapter 12, SERVICING)

2. Adjustment/Test Nose Landing Gear (see Figure 201)

A. Scope of Work Involved.

(1) This procedure checks the following nose landing gear components.

(a) Shock strut trunnion.

(b) Drag brace trunnion.

(c) NLG actuator.

(d) NLG position switches.

(e) NLG door switches.

(f) NLG bumper.

(g) NLG jury brace.

(h) NLG door up-lock sequence valve.

(i) NLG fairing.

(j) NLG door up-lock and stops.

(k) NLG door mechanism.

(2) Prior to conducting this procedure the landing gear normal and emergency controls must be properly rigged (refer to 32-5-0 and 32-6-0).

B. Equipment Required.

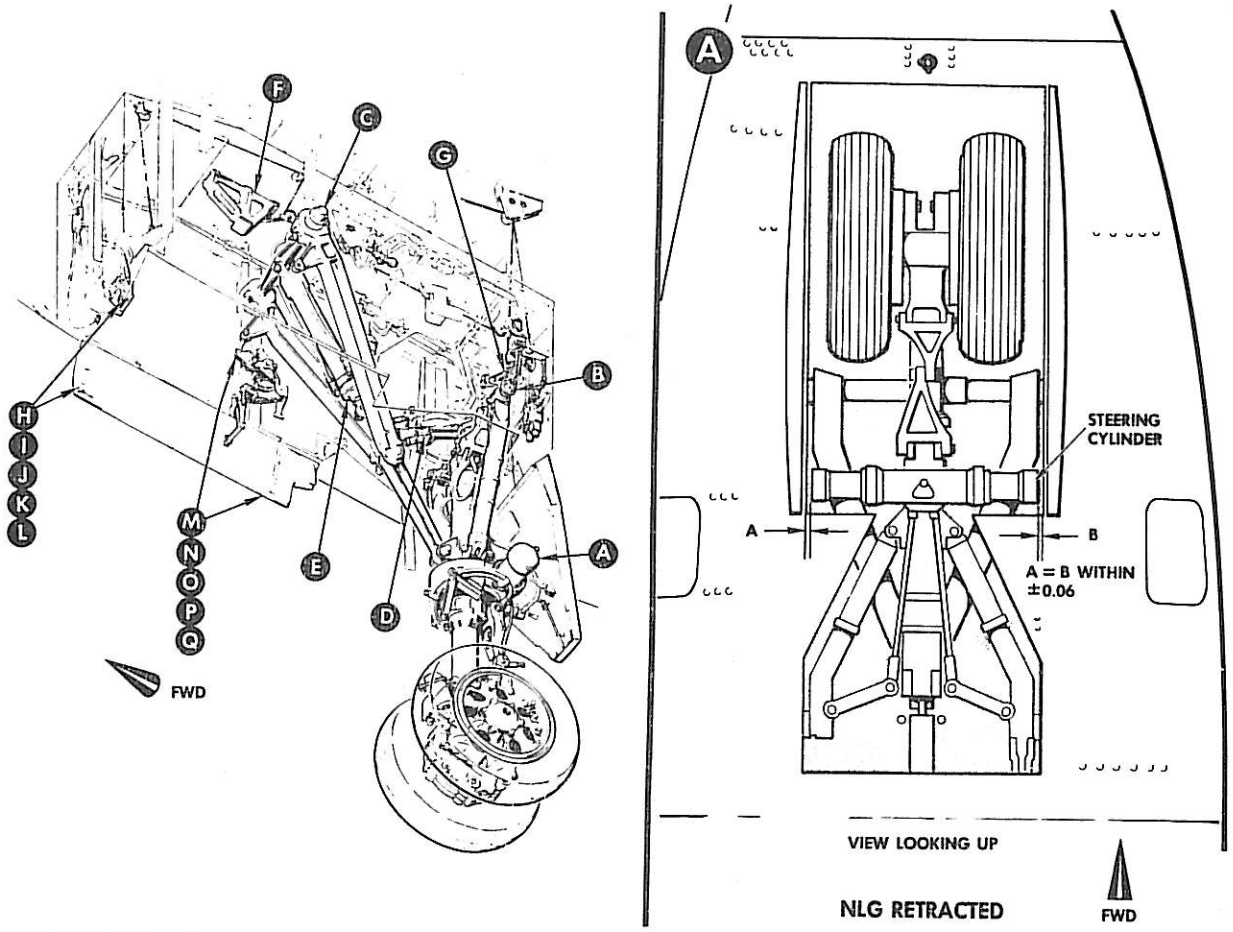
(1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering 3000 psig at 16 gpm.

NOTE: The hydraulic test unit shall have a metering device to limit NLG retraction and extension time to 15 seconds minimum.

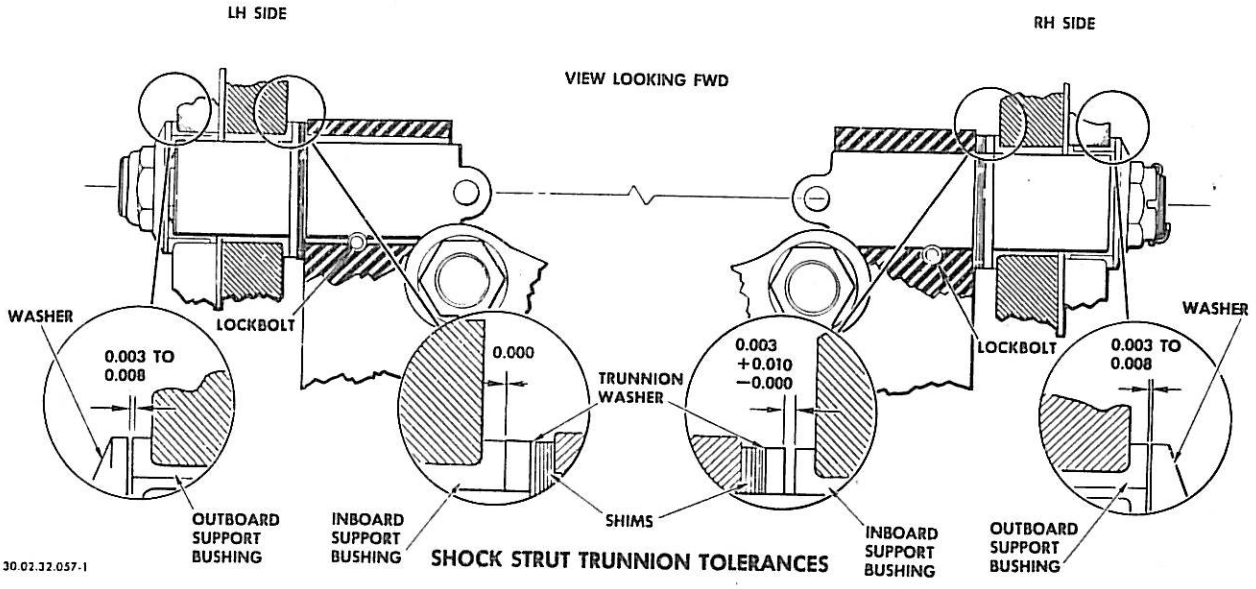
(2) Airplane jacking equipment.

(3) A spring scale capable of measuring up to 100 pounds.

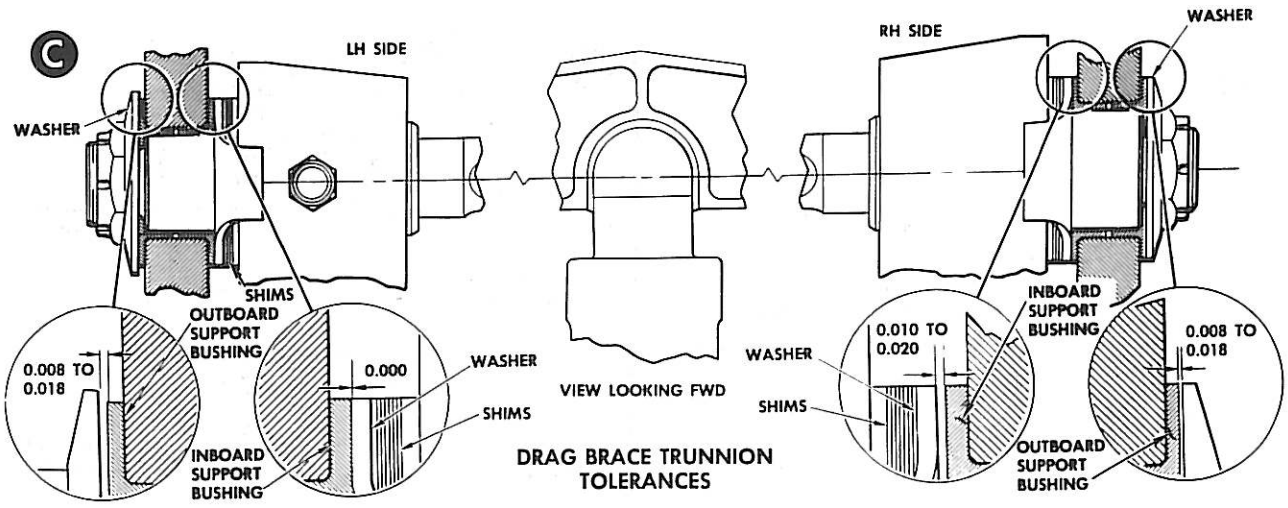
(4) Suitable safety device to support NLG during retracted position checks and/or adjustments.


A
B
D
E
F
G
G
H
I
J
K
L
M
N
O
P
Q
FWD
STEERING CYLINDER
A
B
A = B WITHIN ±0.06
VIEW LOOKING UP
NLG RETRACTED
FWD

B

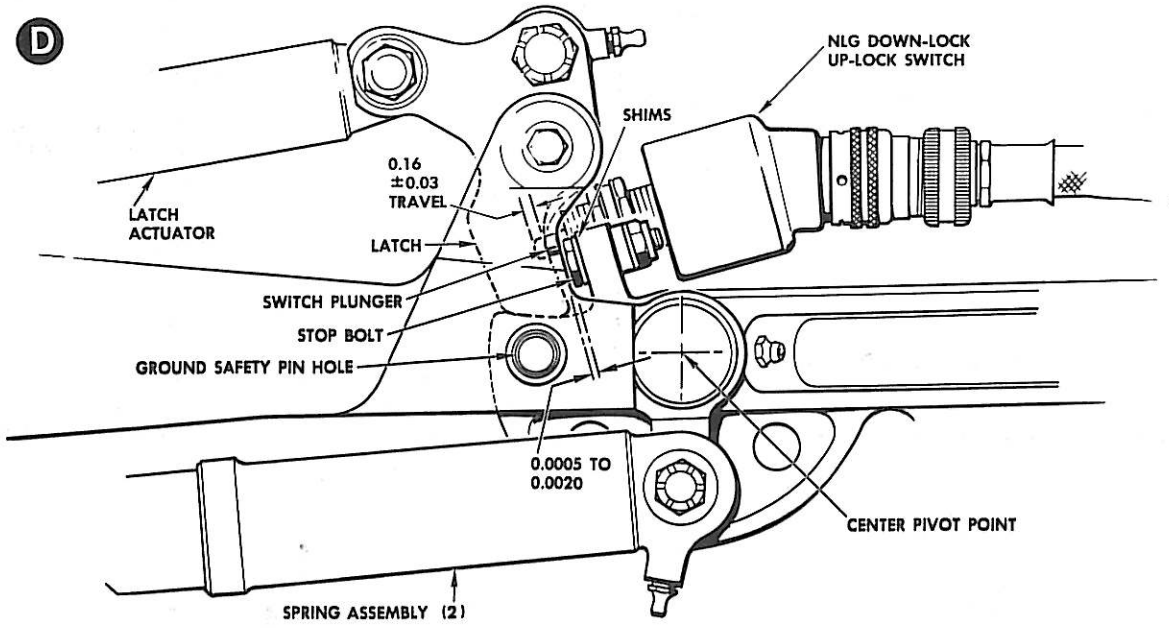

LH SIDE
RH SIDE
VIEW LOOKING FWD
WASHER
0.003 TO 0.008
LOCKBOLT
0.000
TRUNNION WASHER
0.003 +0.010 −0.000
LOCKBOLT
WASHER
0.003 TO 0.008
OUTBOARD SUPPORT BUSHING
INBOARD SUPPORT BUSHING
SHIMS
INBOARD SUPPORT BUSHING
OUTBOARD SUPPORT BUSHING
30.02.32.057-1
SHOCK STRUT TRUNNION TOLERANCES

C



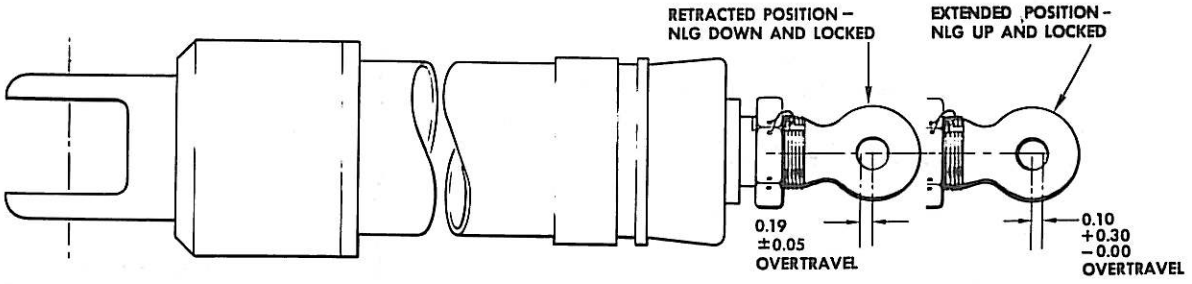
DRAG BRACE TRUNNION TOLERANCES

D



NLG JURY BRACE ADJUSTMENTS

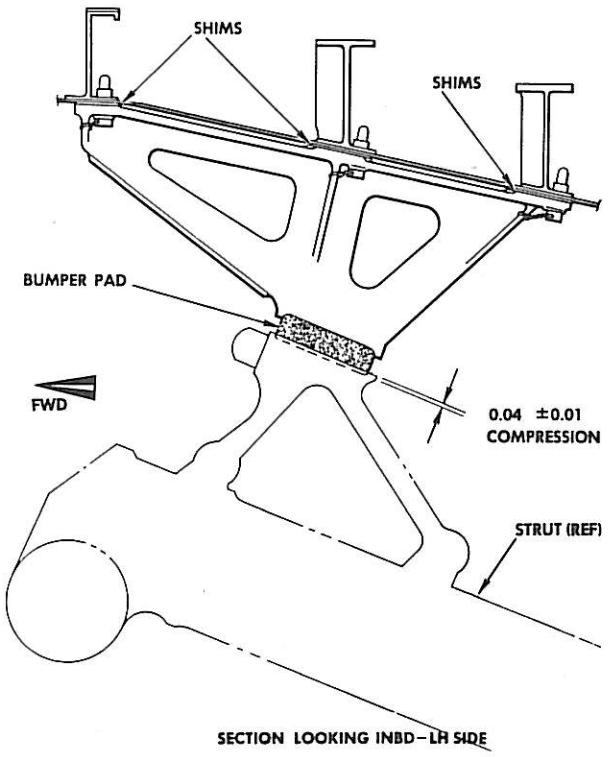
E



NLG ACTUATING CYLINDER ADJUSTMENT

30.02.32.057-2 B

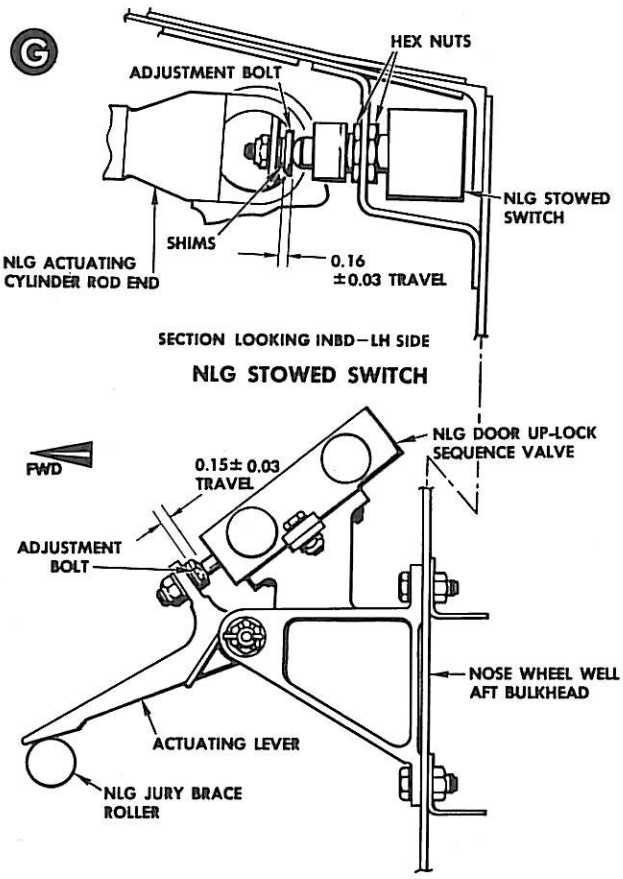
F



SECTION LOOKING INBD–LH SIDE

NLG BUMPER ADJUSTMENT

G



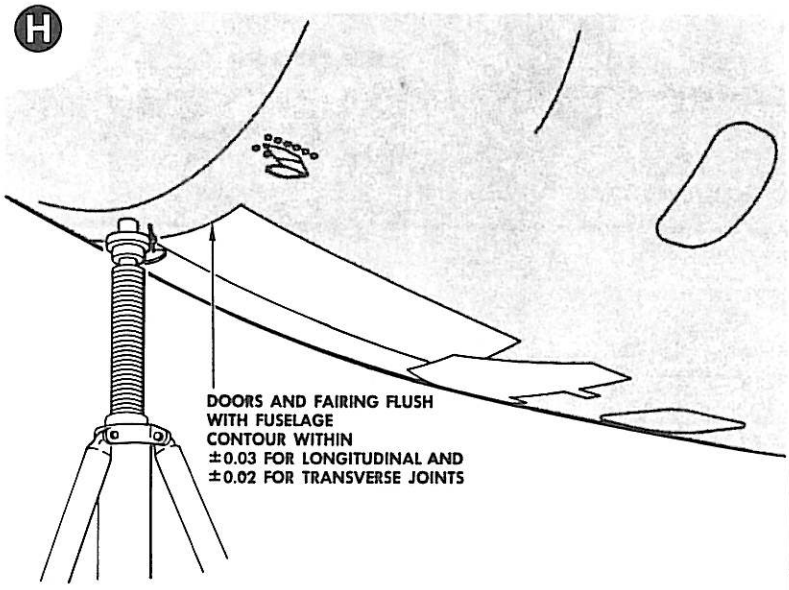
SECTION LOOKING INBD–LH SIDE

NLG STOWED SWITCH

SECTION LOOKING INBD – LH SIDE

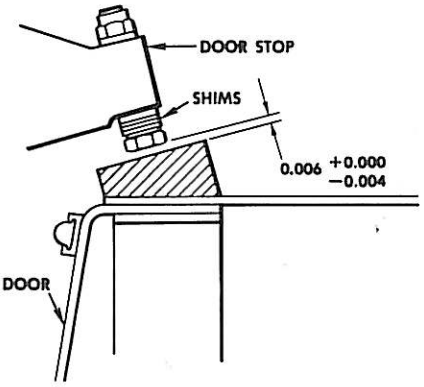
DOOR UP-LOCK SEQUENCE VALVE

H



NLG DOORS AND FAIRING CONTOUR MISMATCH

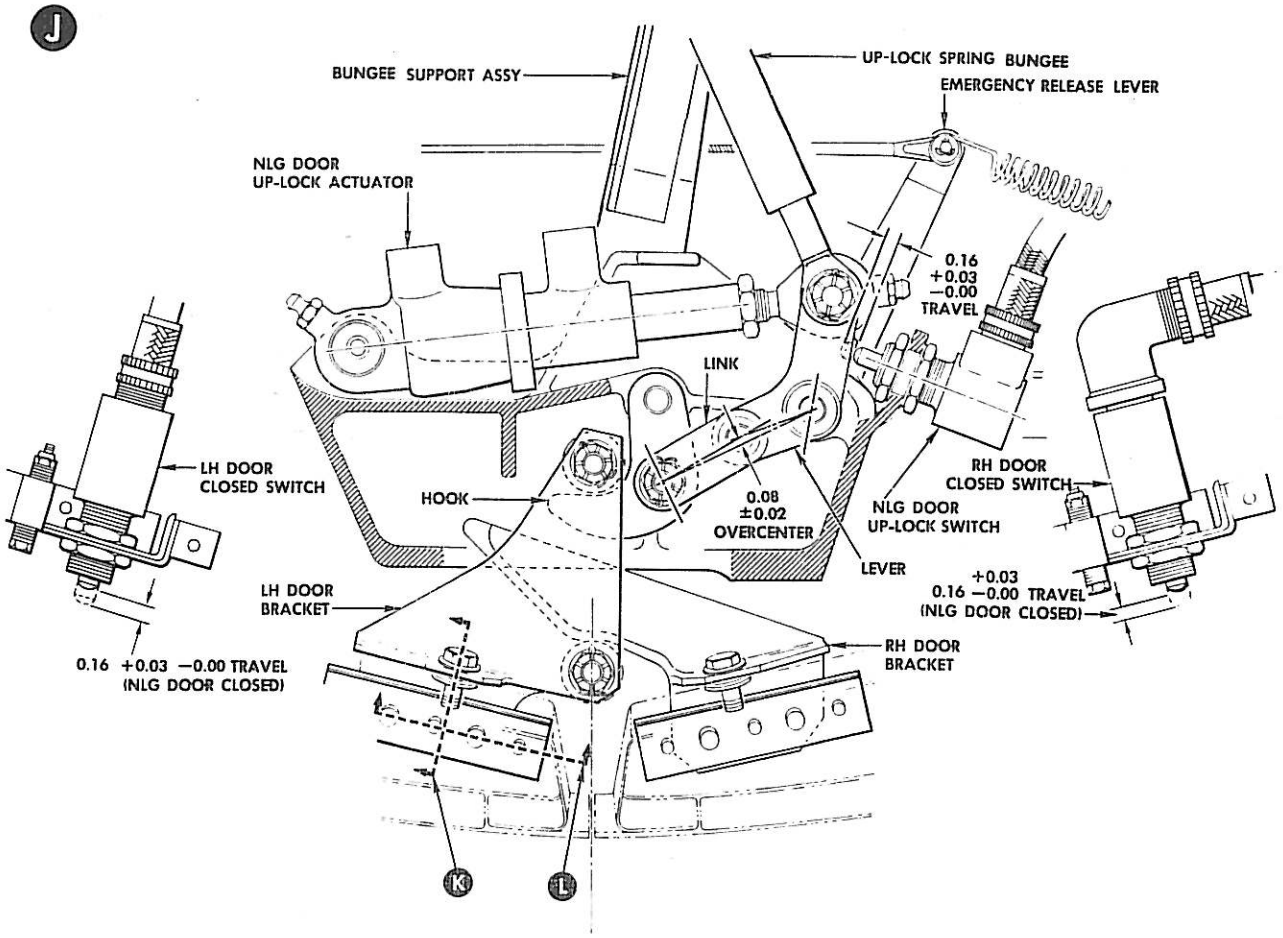
I

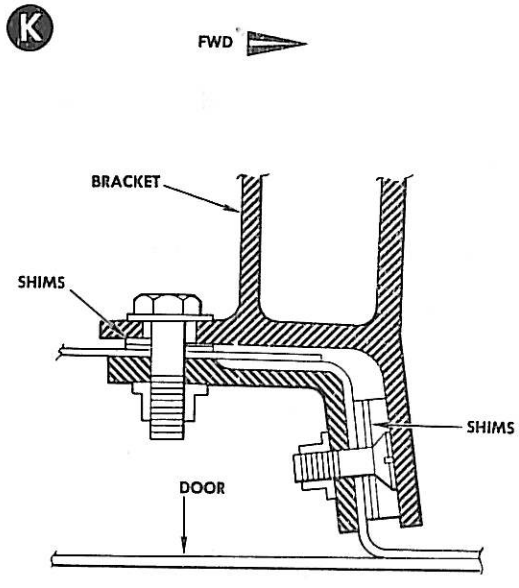


SECTION LOOKING INBD

DOOR STOP ADJUSTMENT

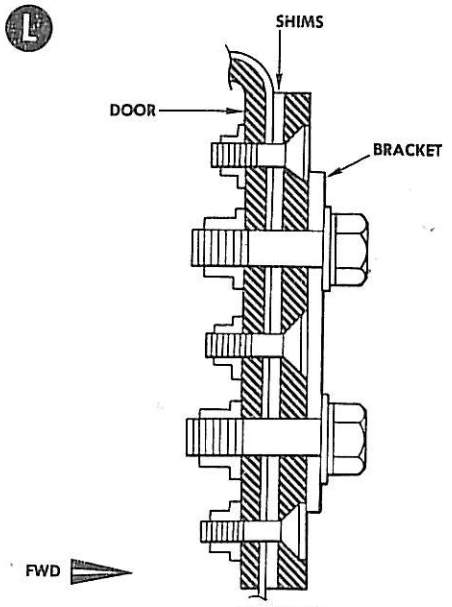
30.02.32.057-3B



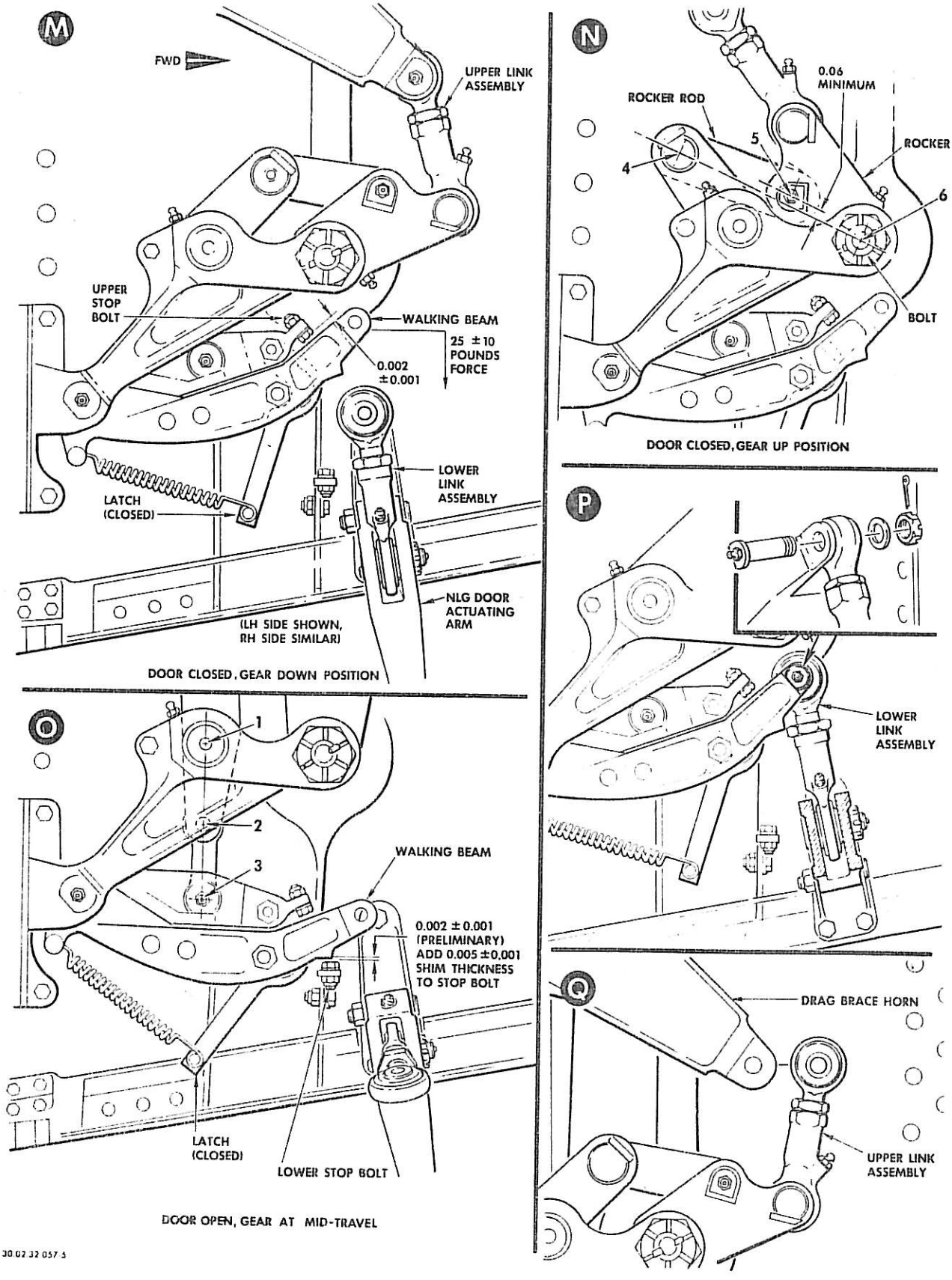


SECTION LOOKING
OUTBOARD LH SIDE

30.02.32.057-4



SECTION
LOOKING UP


M
FWD
UPPER LINK ASSEMBLY
UPPER STOP BOLT
WALKING BEAM
25 ±10 POUNDS FORCE
0.002 ±0.001
LOWER LINK ASSEMBLY
LATCH (CLOSED)
NLG DOOR ACTUATING ARM
(LH SIDE SHOWN, RH SIDE SIMILAR)
DOOR CLOSED, GEAR DOWN POSITION
N
0.06 MINIMUM
ROCKER ROD
ROCKER
4
5
6
BOLT
DOOR CLOSED, GEAR UP POSITION
P
LOWER LINK ASSEMBLY
O
1
2
3
WALKING BEAM
0.002 ±0.001 (PRELIMINARY) ADD 0.005 ±0.001 SHIM THICKNESS TO STOP BOLT
LATCH (CLOSED)
LOWER STOP BOLT
DOOR OPEN, GEAR AT MID-TRAVEL
Q
DRAG BRACE HORN
UPPER LINK ASSEMBLY

30.02.32.057 5

(5) Guard rails to warn personnel from entry into wheel well areas.

C. Preparation.

(1) Jack airplane until landing gear wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING).

(2) Place guard rails around wheel well areas.

(3) Disconnect both NLG doors at lower link assembly connection to left and right door mechanism walking beams; tie doors clear of wheel well (refer to 32-14-2).

(4) Disconnect NLG fairing at link attachment to shock strut; tie fairing clear of wheel well (refer to 32-14-4).

(5) Connect hydraulic test unit to the No. 1 hydraulic system (refer to Chapter 29, HYDRAULIC POWER). Do not apply hydraulic power.

D. Procedure.

Figure Detail

WARNING: DURING NLG CHECKS OR ADJUSTMENTS WITH THE NLG RETRACTED, THE NLG SHALL BE BRACED WITH A SUITABLE SAFETY DEVICE TO PREVENT POSSIBLE INJURY TO PERSONNEL.

(1) With the airplane on jacks and the nose landing gear in the down position, jam the shock strut to the left and check the shock strut trunnions for the following clearances:

(a) The right trunnion clearance between inboard face of inboard support bushing and outboard face of trunnion washer shall be 0.003 (+0.010, -0.000) inch. — B

(b) The left trunnion clearance between inboard face of inboard support bushing and outboard face of the trunnion washer shall be 0.000 inch. — B

(c) The right trunnion clearance between outboard face of outboard support bushing and inboard face of trunnion pin washer shall be 0.003 to 0.008 inch. — B

(2) Bottom the shock strut out to the right. The left trunnion clearance between outboard face of outboard support bushing and inboard face of trunnion pin washer shall be 0.003 to 0.008 inch. — B

(3) Check the centering of trunnion by slowly raising the NLG shock strut until the steering cylinder just enters the wheel well opening. The left and right clearance shall be identical (±0.06 inch). — A

Figure Detail

(4) With the airplane on jacks and the nose landing gear in the down position, jam the drag brace to the left and check the drag brace trunnions for the following clearances:

(a) The right trunnion clearance between inboard face of support bushing and outboard face of washer shall be 0.010 to 0.020 inch. — C

(b) The left trunnion clearance between inboard face of support bushing and outboard face of washer shall be 0.000 inch. — C

(c) The right trunnion clearance between outboard face of support bushing and inboard face of washer shall be 0.008 to 0.018 inch. — C

(5) Bottom the drag brace out to the right. The left trunnion clearance between outboard face of support bushing and inboard face of washer shall be 0.008 to 0.018 inch. — C

(6) Check that latch on NLG jury brace is bottomed out. The desired clearance between stop bolts and mating surfaces is 0.005 to 0.0020 inch. Maximum allowable service clearance is 0.0100 inch. Clearances greater than 0.0100 inch may indicate excessive wear of the jury brace latch (bell crank), aft link stop bolts, or both. Remove jury brace assembly and inspect, overhaul, reassemble, and adjust as necessary per Model 30 (990) Overhaul Manual, Chapter 32-3-3. — D

CAUTION: Do not adjust jury brace stop bolts with jury brace assembly installed on aircraft because an undercenter locked condition of the jury brace may result. This could cause possible difficulty in hydraulic release of the NLG from the uplocked position.

(7) With the NLG down and locked, check the NLG actuating cylinder overtravel as follows:

(a) With hydraulic pressure reduced to 0 psig (refer to Chapter 12, SERVICING) and the NLG actuating cylinder connected to jury brace, measure distance from the cylinder gland nut to end of actuating cylinder rod.

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-87

Insert facing 32-3-0, Page 208, dated June 17/69 (or subsequent). This temporary revision supersedes Temporary Revision No. 32-45, dated Sep. 17/62.

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletion No. 32-15, substitute the following instructions where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 2.D.(6) and replace with the following:

Figure Detail

(6) Check that latch on NLG jury brace is bottomed out. The desired clearance between stop bolts and mating surfaces is 0.005 to 0.0035 inch. Maximum allowable service clearance is 0.0100 inch. Clearances greater than 0.0100 inch may indicate excessive wear of the jury brace latch (bellcrank), aft link stop bolt, or both. Remove jury brace assembly and inspect, overhaul, reassemble, and adjust as necessary per Model 30 (990) Overhaul Manual, Chapter 32-3-3. — D

CAUTION: Do not adjust jury brace stop bolts with jury brace assembly installed on aircraft because an undercenter locked condition of the jury brace may result. This could cause possible difficulty in hydraulic release of the NLG from the uplocked position.

Delete text in steps 2.D.(7)(d) and 2.D.(7)(e) and replace with the following:

(d) Maintain hydraulic pressure and measure distance from gland face to end of actuating cylinder rod.

(e) Actuating cylinder overtravel (difference between dimensions measured in steps (a) and (d) preceding) shall be 0.25 (±0.03) inch. — E

CONVAIR MODEL 30

MAINTENANCE MANUAL

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Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete text in step 2.D.(6) and replace with the following:

	Figure Detail
(6) Check that latch on MLG jury brace is bottomed out. The desired clearance between stop bolts and mating surfaces is 0.095 to 0.0035 inch. Maximum allowable service clearance is 0.0100 inch. Clearances greater than 0.0100 inch may indicate excessive wear of the jury brace latch (bellcrank), axis link stop bolt, or both. Remove jury brace assembly and inspect, overhaul, reassemble, and adjust as necessary per Model 30 (990) Overhaul Manual, Chapter 32-3-3.	D

CAUTION: Do not adjust jury brace stop bolts with jury brace assembly installed on aircraft because an undercenter locked condition of the jury brace may result. This could cause possible difficulty in hydraulic release of the MLG from the uplocked position.

Delete text in steps 2.D.(7)(d) and 2.D.(7)(e) and replace with the following:

(d) Maintain hydraulic pressure and measure distance from gland face to end of actuating cylinder rod.

(e) Actuating cylinder overtravel (difference between dimensions measured in steps (a) and (d) preceding) shall be 0.25 (±0.03) inch. E

Figure Detail

(b) Disconnect actuating cylinder rod end from NLG jury brace (refer to 32-4-4).

(c) Slowly apply hydraulic pressure to No. 1 hydraulic system and retract actuating cylinder piston.

NOTE: Landing gear control lever must be in DOWN position.

(d) Maintain hydraulic pressure and manually pull down on piston rod to assure firm seating of piston rod driver on floating piston. Measure distance from gland face to end of actuating cylinder rod.

(e) Actuating cylinder overtravel (difference between dimensions measured in steps (a) and (d) preceding) shall be 0.19 (±0.05) inch. E

(f) Move landing gear control lever to NEUTRAL position and reduce hydraulic pressure to 0 psig.

(g) Temporarily connect actuating cylinder rod end to jury brace.

(8) Check the NLG down-lock up-lock switch for correct adjustment. Switch plunger shall be depressed 0.16 (±0.03)-inch when gear is down and locked. D

(9) Check the nose landing gear up position as follows:

(a) Pressurize No. 1 hydraulic system (refer to Chapter 29, HYDRAULIC POWER) and raise NLG to up position. All rotating joints in drag brace and shock strut shall rotate freely during retraction.

(b) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(c) NLG up-bumper pad shall be compressed 0.04 (±0.01) inch when NLG is up and locked. F

NOTE: Use shims as necessary to meet the bumper rubber pad preloading condition. The thickness of the shims must not exceed 0.258 inch and all three shimming surfaces must have equal amounts of shims.

(d) NLG stowed switch plunger shall be depressed 0.16 (±0.03) inch when NLG is up and locked. Adjust switch and/or adjustment bolt to obtain correct travel. G

Figure
Detail

(10) Check the NLG actuating cylinder up position overtravel as follows:

(a) With the NLG up and locked and No. 1 hydraulic system pressurized, measure distance from actuating cylinder gland nut to end of actuating cylinder rod.

(b) Extend NLG to the down and locked position, relieve hydraulic pressure, and disconnect actuating cylinder rod end from the jury brace.

(c) Place landing gear control lever in the UP position and slowly apply hydraulic pressure to No. 1 hydraulic system.

(d) Measure distance from actuating cylinder gland nut to end of actuating cylinder rod.

(e) Overtravel (difference between dimensions measured in steps (a) and (d) preceding) shall be 0.10 (+0.30, -0.00) inch. Adjust rod end as required until overtravel is within tolerance. E

(f) Move landing gear control lever to NEUTRAL and reduce hydraulic pressure to 0 psig.

(g) Reconnect actuating cylinder rod end to jury brace (refer to 32-4-4).

NOTE: Any time the NLG actuating cylinder adjustment is changed, the NLG door mechanism final check, step 2.D.(14)(h), must be performed.

(11) With the NLG up and locked, check NLG door up-lock sequence valve adjustment. Valve plunger shall be depressed 0.15 (±0.03) inch. Add or remove shims under head of adjustment bolt on actuating lever to obtain correct travel. G

(12) Check NLG fairing gaps and mismatch with NLG in the up-and-locked position. Skin gap around fairing periphery shall be 0.060 (+0.000, -0.030) inch. Adjust fairing links as required to match fairing contour with fuselage within ±0.03 inch for longitudinal joints and ±0.02 inch for transverse joints; connect links to shock strut (refer to 32-14-4). H

(13) Check the NLG door up-lock and stops as follows:

(a) Apply hydraulic pressure to the extend port of NLG door up-lock actuator and bottom out actuator in locked position. J

(b) Center of bolt connecting link to lever shall be overcenter 0.08 (±0.02) inch. Adjust actuator rod end to obtain this dimension. J

	Figure Detail
(c) Apply hydraulic pressure to the retract port of actuator. The door up-lock shall open.	
(d) Close left door (leave right door open) and manually close door up-lock.	
(e) Pull down on left door. Up-lock hook shall support door flush with fuselage contour (±0.02 inch). Adjust by adding or removing shims at left door bracket to meet contour requirement.	H
(f) Clearance between left door and stops shall be 0.006 (+0.000, -0.004) inch.	I
NOTE: Door stop clearance is used only in course of rigging to obtain door up-lock hook-to-door roller clearance for normal operation. During normal operation, the door is loaded against stops by door mechanism preload.	
(g) Release door up-lock and open left door.	
(h) Close both doors and manually close door up-lock. Skin gap between doors and fuselage shall be 0.060 (+0.000, -0.030) inch.	H,J
NOTE: Check that ramp on right door bracket is between rollers on left door bracket.	
(i) Right door shall be flush with left door (±0.01 inch). Add or remove shims at right door bracket to meet contour requirement.	J,K,L
(j) Clearance between right door and stops shall be 0.006 (+0.000, -0.004) inch.	I
(k) Clearance between notch in lower edge of emergency release lever (forward side of up-lock) and hook link bolt shall be 0.060 (±0.010) inch. (Refer to 32-6-0, step 1.C.(4) if adjustment is required.)	
(l) The NLG door up-lock switch plunger shall be depressed 0.16 (+0.03, -0.00) inch with up-lock closed.	J
(m) The NLG left and right door closed switch plungers shall be depressed 0.16 (+0.03, -0.00) inch with doors closed and against door stops.	J
(n) Actuate door up-lock to open position and manually lower doors.	

Figure
Detail

(14) Check the NLG door mechanism as follows:

NOTE: Prior to accomplishing NLG door mechanism rigging procedure, the NLG and NLG door up-lock must be properly adjusted. If NLG is not properly adjusted, the door mechamism may not meet final check requirement at end of procedure. Accomplish NLG door mechanism rigging procedure in the following sequence, without omitting any steps.

(a) With the NLG in the down-and-locked position manually open both doors, using the ground access latches.

(b) Adjust the left-hand door mechanism as follows:

1) Disconnect the lower link assembly from the walking beam. — M,P

2) Close the ground access latch, making sure that latch bolt is in throat of hook. — M

3) Connect a spring scale to the forward end of the walking beam and pull down with a force of 25 (±10) pounds. Clearance between the head of the upper stop bolt and the walking beam shall be 0.002 (±0.001) inch. Adjust shims under head of stop bolt to obtain correct clearance. — M

4) Disconnect the upper link assembly at the NLG drag brace. — M,Q

5) Operate the mechanism by hand until the walking beam is at lowest point of travel, with points 1, 2, and 3 in line. If mechanism cannot be moved without the aid of tools, the mechanism must be disassembled and freed. The preliminary clearance between the lower surface of the walking beam and the head of the lower stop bolt shall be 0.002 (±0.001) inch. Adjust shims under head of stop bolt to obtain preliminary clearance, then add 0.005 (±0.001)-inch shim thickness and secure stop bolt. — O

6) Rotate the NLG door mechanism to the door closed, gear up position (with gear extended). — N

7) With the door held in contour, line up the hole in the lower link assembly and the hole in the walking beam. Adjust as required by turning the rod end (upper end) in the link. — P

Figure Detail

8) Shorten the lower link assembly two full turns and connect link to the walking beam; do not install cotter pin. — P

NOTE: The grease fitting in pivot bolt must point towards center of wheel well.

9) Rotate the NLG door mechanism to the door closed, gear down position (with gear extended). Hold door against stops and align hole in the upper link assembly and hole in the NLG drag brace. Adjust by turning the rod end (upper end) in the link. — M,Q

10) Shorten the upper link assembly one and one half turns and connect link to the NLG drag brace; do not safety-wire at this time. — Q

11) Check door droop. With the door closed and the ground access latch properly seated, door droop measured at the forward inboard corner of the door shall be 1.5 to 2.0 inches. Shorten upper link assembly to increase door droop. Lengthen upper link assembly to decrease door droop.

NOTE: Rig door droop as close to 1.5-inch dimension as possible.

(c) Repeat steps (b) 1) through (b) 11) for the right-hand door.

(d) Manually close and latch both doors.

NOTE: Ground access latches must move to the fully latched position by spring action only. If they do not, examine the mechanism for excessive friction or faulty parts.

(e) Perform door mechanism preload check as follows:

1) Manually open both NLG doors, using the ground access latches.

2) With door up-lock in the open position disconnect hydraulic line from "close" side of actuating cylinder, and cap.

3) Disconnect right-hand door mechanism at lower link assembly connection to walking beam. Tie door in full open position. — M

Figure
Detail

4) Using hydraulic power at reduced pressure, slowly retract the NLG. Left-hand door shall close.

5) Maintain gear up pressure and attach spring scale to forward inboard corner of door. At a pull of 70 pounds the door shall not move from door stops more than 0.10 inch. At a pull of 80 pounds the door shall move from the stops. If door moves more than 0.10 inch at 70 pounds, shorten lower link. If door does not move at 80 pounds, lengthen lower link.

6) After adjustment of lower link per preload requirements, readjust door droop per step (b) 11).

NOTE: Any adjustment made to lower link assembly on left-hand door shall be applied to right-hand door and step (b) 11) repeated.

7) Reconnect right-hand door mechanism and door up-lock actuating cylinder.

(f) With both NLG doors adjusted per steps (b) 3) through (e) 7), perform door lead check as follows:

1) Manually close and latch both doors.

2) Using hydraulic power at reduced pressure, retract the NLG and check clearance as NLG moves past door area.

CAUTION: OPERATE NLG SLOWLY TO PREVENT POSSIBLE DAMAGE TO NLG DOORS.

3) As the doors close during gear retraction or extension the tip of the right-hand door up-lock bracket shall enter the left-hand door up-lock bracket half way between the rollers. Adjust lower link assembly of right-hand door in half-turn increments to meet requirement. J,P

NOTE: If right-hand door leads, lengthen lower link; if right-hand door lags, shorten lower link.

4) If right-hand door lower link adjustment was changed in preceding step (f) 3), readjust right-hand door upper link assembly per step (b) 11). Upper link adjustment will be approximately equal to lower link adjustment.

Figure Detail

(g) Cycle the gear several times, checking for proper operation. Recheck door up-lock bracket engagement, step (f) 3), and door drop, step (b) 11).

(h) Perform door mechanism final check as follows:

1) Disconnect either NLG door at lower link assembly connection to walking beam. Tie door in the full open position. M

2) Slowly retract NLG to the up-and-locked position.

3) Maintain 3000 psig hydraulic pressure on gear and check that point 5 of connected door is 0.06 inch, minimum, above reference line between points 4 and 6. If 0.06 inch minimum dimension is not met, decrease door droop to 1.5 inch, minimum, per step (b) 11), and repeat steps (14)(e) thru (14)(g). N

4) Extend NLG to down-and-locked position and reconnect lower link assembly disconnected in step (h) 1). P

5) Repeat steps (h) 1) through (h) 4) for opposite NLG door.

(i) Set jam nuts on link assemblies.

(j) Torque all castle nuts in the NLG door mechanism, plus the walking beam rod bolt and the upper link assembly bolt to 5 to 10 inch-pounds (See 32-14-2, Figure 201). Secure castle nuts with cotter pins and safety-wire nuts on the walking beam rod bolt and the upper link assembly bolt.

(15) Perform Landing Gear System - Operational Check (refer to 32-0).

NOSE LANDING GEAR SHOCK STRUT - TROUBLE SHOOTING

POSSIBLE CAUSE	ISOLATION PROCEDURE AND CORRECTION
1. SHOCK STRUT FAILS TO HOLD PRESSURE	
A. Air leak at strut air valve.	Check the tightness of valve body or hex swivel nut. Torque valve body 100 to 110 inch-pounds. Torque hex swivel nut 50 to 100 inch-pounds. If valve still leaks, check seat of stem for dirt; remove dirt or replace valve. Check for deteriorated "O" ring packing at base of hex nut and "O" ring packing back-up ring in stem. Replace if necessary.
B. Leak at strut gland nut.	Replace "O" ring packings with spares on OD of lower bearing. If leakage still occurs, replace strut.
C. Leak at top of cylinder.	"O" ring packings probably deteriorated; replace strut.
2. PISTON STICKS OR BINDS	
A. Air pressure too low.	Charge strut to the correct extension according to the instruction plate.
B. Dirt in packing back-up rings, wiper or gland area.	Check packing back-up rings, wiper, or felt in gland area for dirt. If no dirt is found and piston still sticks or binds, replace strut.

NOSE LANDING GEAR (NLG) SHOCK STRUT - MAINTENANCE PRACTICES

1. Servicing NLG Shock Strut (refer to Chapter 12, SERVICING)

2. Removal/Installation NLG Shock Strut (see Figure 201)

   A. Equipment Required.

      (1) Airplane nose jacking equipment.

      (2) NLG strut restraining clamp.

      (3) Suitable dolly to support NLG.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      ANTI-SKID NOSE POWER.

      LANDING GEAR POS & WARN.

      WARN HORN.

      (3) Check that landing gear ground safety pins are installed.

      (4) Release NLG door ground access latches and open NLG doors (refer to 32-14-0).

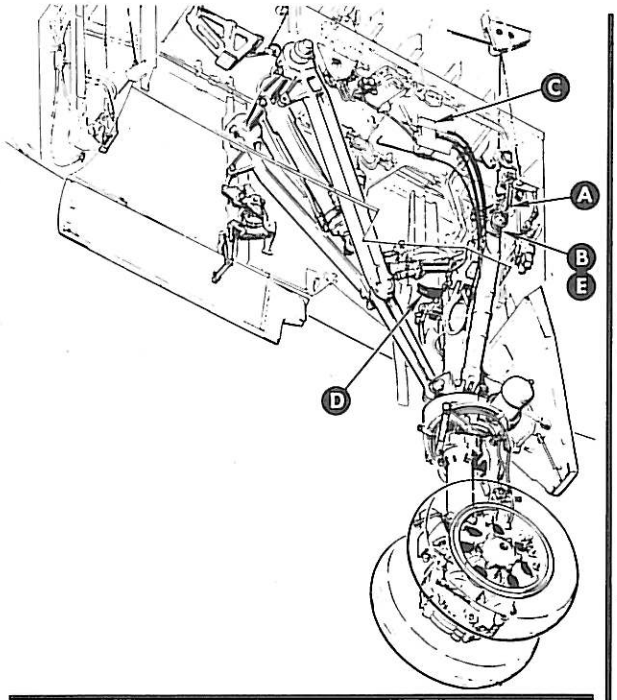
      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

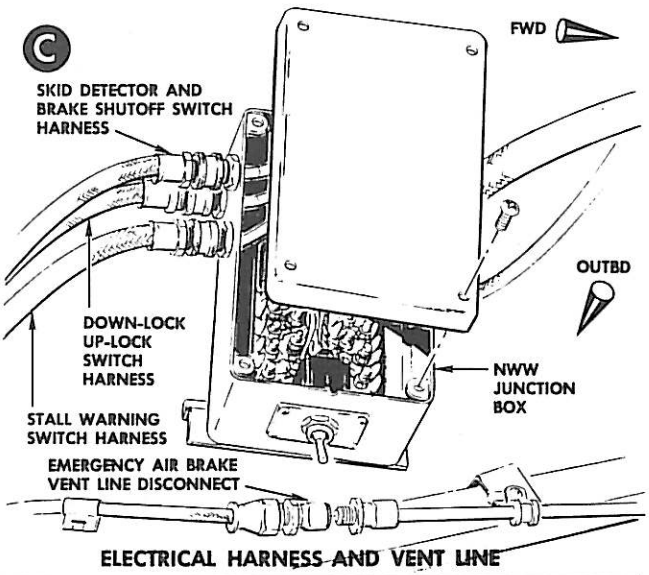
      (5) Jack airplane at fuselage nose jack point until NLG wheels are clear of the ground (refer to Chapter 7, LIFTING AND SHORING).

   C. Remove NLG Shock Strut.

      (1) Relieve air pressure in NLG shock strut (refer to Chapter 12, SERVICING).

      (2) Position suitable dolly under NLG wheels to take load off shock strut trunnion pins. Install NLG strut restraining clamp to hold shock strut compressed.





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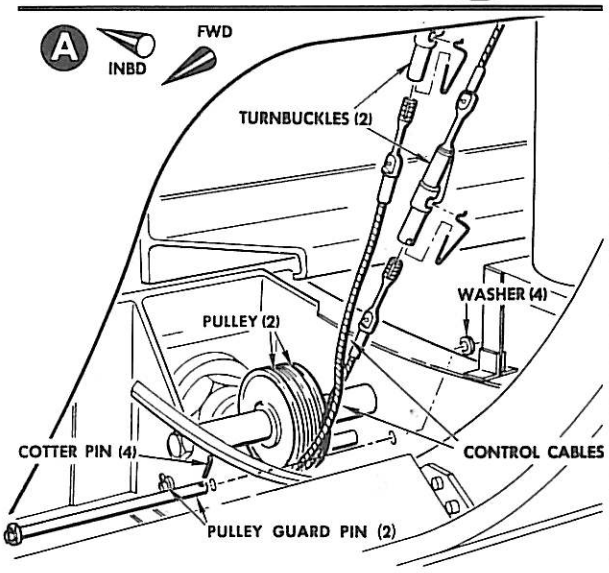
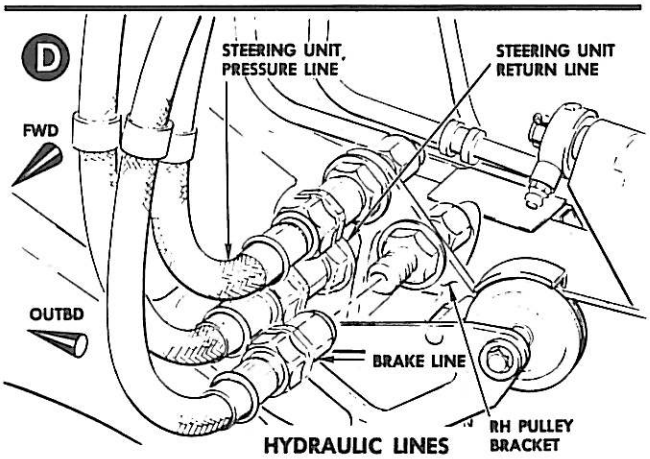
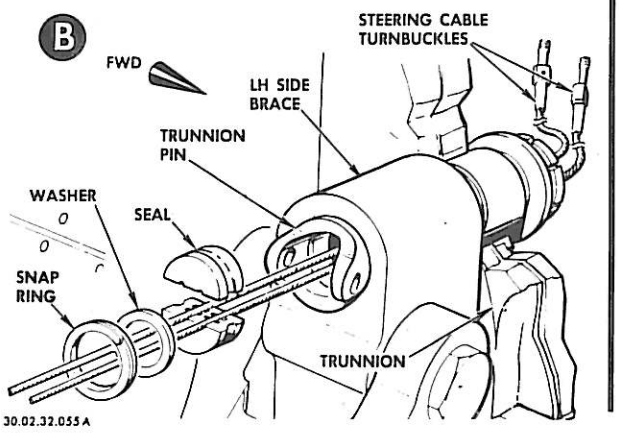
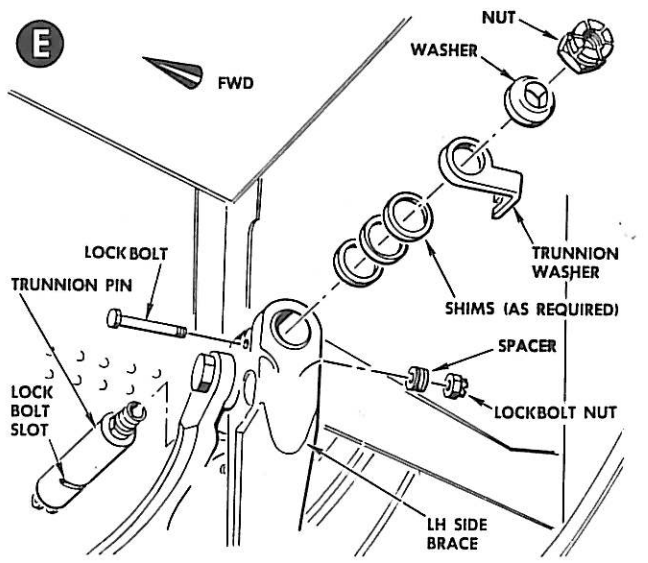




HYDRAULIC LINES



30.02.32.055 A



TRUNNION PIN ASSEMBLY
LH SHOWN – RH SIMILAR

Figure Detail

(3) Disconnect emergency air brake vent line at fitting on NLG fairing (refer to 32-14-4).

(4) Disconnect fairing links from NLG shock strut and tie fairing clear of strut (refer to 32-14-4).

(5) Disconnect steering cables at turnbuckles in left electrical equipment "tunnel" compartment and remove cable guards at pulley bracket outboard of NLG left trunnion pin. A

(6) Remove snap ring, washer, and split cable seal from NLG left trunnion pin; pull steering cables through trunnion pin. B

(7) Remove nose wheel well left-hand junction box cover and disconnect brake shutoff switch, skid detector, down-lock up-lock switch, and stall warning switch harnesses at terminals in junction box. Disconnect harness conduits from aft side of junction box and pull disconnected wires from box. C

(8) Remove support clamp securing down-lock up-lock switch harness to NLG jury brace and disconnect harness from switch (refer to 32-10-4).

(9) Disconnect emergency air brake vent line at union fitting below nose wheel well left-hand junction box. C

(10) Identify and disconnect three hydraulic lines at bracket on upper right side of shock strut. D

(11) Disconnect forward end of bungee spring from NLG jury brace (refer to 32-3-3).

(12) Disconnect aft end of NLG jury brace from upper end of shock strut (refer to 32-3-3).

(13) Disconnect lower end of NLG drag brace from forward side of shock strut (refer to 32-3-2). Tie drag brace, jury brace, and bungee spring clear of NLG shock strut.

(14) In the left and right electrical equipment "tunnel" compartments, remove shock strut trunnion pin nuts and washers. E

Figure Detail

(15) Remove trunnion pin lockbolts, and remove trunnion pins, washers, and laminated shims from the shock strut trunnions. Avoid damaging trunnion pin threads. — E

NOTE: Record thickness of shims between trunnions and trunnion washers to facilitate shock strut installation.

(16) Lower dolly and remove NLG shock strut from airplane.

D. Install NLG Shock Strut.

(1) Place NLG shock strut on suitable support dolly and install strut restraining clamp to hold shock strut compressed.

(2) Check that NLG fairing, drag brace, and jury brace are tied out of the way. Move shock strut assembly into position for installation and align trunnion fittings.

(3) Align trunnion washers and laminated shims (preliminary shim thickness determined in step C.(15) of removal procedure) with trunnion pin holes and install trunnion pins. Add or remove shim laminations at each trunnion pin to center strut in wheel well and maintain 0.003 (+0.010, -0.000)-inch end play between trunnion inboard support bushings (refer to 32-3-0, Figure 201). — E

NOTE: Trunnion shim laminations are 0.003 inch thick. Check centering of strut in wheel well by raising strut until steering unit just enters wheel well and measure left and right clearances betwen steering unit and sides of wheel well. Dimensions shall be identical within 0.06 inch.

(4) Rotate trunnion pins to align slot with lockbolt holes; install lockbolts, spacers, and nuts. — E

NOTE: Tabs of trunnion washers shall engage spacers on trunnion pin lockbolts. Tabs and spacers shall also be located on aft side of strut side braces.

(5) In the left and right electrical equipment "tunnel" compartments, install trunnion pin washers and nuts. Adjust shock strut trunnion clearances (refer to 32-3-0, steps 2.D.(1) thru 2.D.(3)), and secure right-hand trunnion pin nut with cotter pin. — E

(6) Deleted.

Figure Detail

(7) Connect lower end of NLG drag brace to forward side of shock strut (refer to 32-3-2).

(8) Connect NLG jury brace to fitting on upper end of shock strut (refer to 32-3-3).

(9) Connect bungee spring to jury brace (refer to 32-3-3).

(10) Connect three hydraulic line fittings at bracket on upper right side of shock strut, as identified in step C.(10). — D

(11) Connect electrical harness to down-lock up-lock switch on NLG jury brace and secure harness to jury brace with clamp (refer to 32-10-4).

(12) Connect emergency air brake vent line at union fitting below nose wheel well left-hand junction box. — C

(13) Connect three electrical harness conduits from NLG shock strut to aft side of nose wheel well junction box and connect correct wires together at terminals in junction box (refer to Wiring Diagram Manual). Install junction box cover. — C

(14) Insert steering cables through snap ring, washer, and NLG left trunnion. Route cables through pulley bracket in left electrical equipment "tunnel" compartment and connect to upper steering cables at turnbuckles. Install cable guards at pulley bracket. — A,B

(15) Install split cable seal on steering cables inboard of NLG left trunnion pin. Safety-wire seal halves together with approximately five turns of safety wire and twist ends together so that no part of the safety wire extends beyond outside diameter of seal. Insert seal into NLG left trunnion pin and secure with washer and snap ring. — B

(16) Deleted.

(17) Deleted.

(18) Remove NLG strut restraining clamp and support dolly.

(19) Service NLG shock strut with clean hydraulic fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(20) Remove warning tags and close circuit breakers opened in step B.

(21) Perform Adjustment/Test Nose Wheel Steering System (refer to 32-7-0).

Figure Detail

(22) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0).

(23) Perform Adjustment/Test Landing Gear System - Operational Check (refer to 32-0).

(24) Bleed nose wheel brakes (refer to 32-8-0, Adjustment/ Test Brakes - Bleeding Procedure).

3. Removal/Installation NLG Shock Strut Seals (see Figure 202)

A. Equipment Required.

(1) Airplane nose jacking equipment.

(2) Gland nut spanner wrench, Cleveland Pneumatic Tool Co., No. T-48752 or equivalent.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Jack fuselage nose (refer to Chapter 7, LIFTING AND SHORING).

(3) Open and attach warning tags to ANTI-SKID NOSE POWER, and WARN circuit breakers, on main circuit breaker panel.

C. Remove NLG Shock Strut Seals.

(1) Relieve air pressure and drain hydraulic fluid from NLG shock strut (refer to Chapter 12, SERVICING).

(2) Disconnect NLG skid detector harness at quick disconnect on detector housing. — A

(3) Disconnect brake line at quick disconnect on NLG. Pull out on knurled nut and turn counterclockwise. — A

(4) Disconnect two quick disconnect clamps attaching skid detector harness to NLG torque arms. — A

(5) Disconnect NLG torque arms at apex. Pull out and twist disconnect handle one quarter turn so that disconnect joint will remain disengaged. — A

(6) Remove nuts, bolts, and washers that secure lock tab to the torque collar nut; remove lock tab. — B

(7) Using spanner wrench, loosen shock strut gland nut until it is free from cylinder. — B

NOTE: Do not loosen torque collar nut.

(8) Remove NLG ground safety pin.

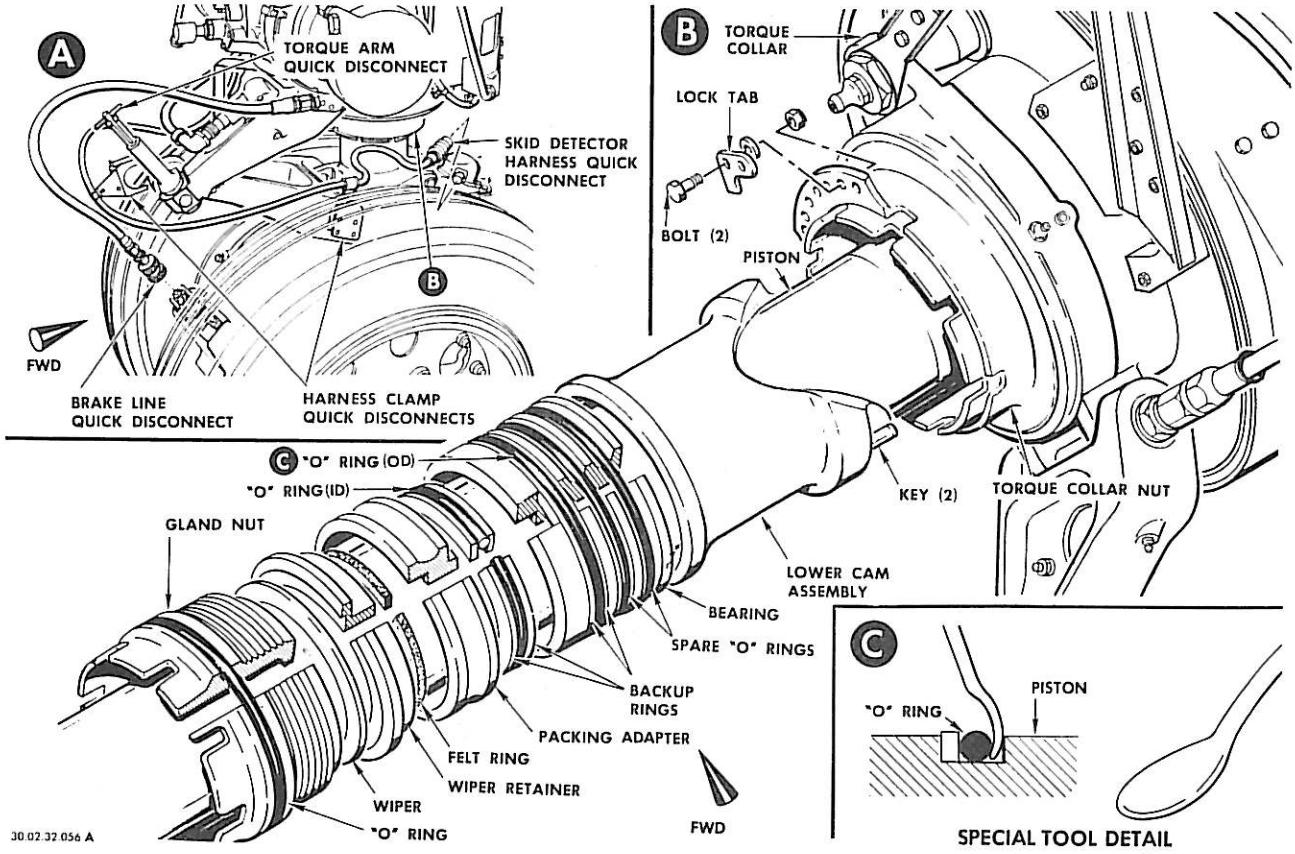

A
TORQUE ARM QUICK DISCONNECT
SKID DETECTOR HARNESS QUICK DISCONNECT
B
FWD
BRAKE LINE QUICK DISCONNECT
HARNESS CLAMP QUICK DISCONNECTS
B
TORQUE COLLAR
LOCK TAB
BOLT (2)
PISTON
KEY (2)
TORQUE COLLAR NUT
LOWER CAM ASSEMBLY
C
"O" RING (OD)
"O" RING (ID)
GLAND NUT
BEARING
SPARE "O" RINGS
BACKUP RINGS
PACKING ADAPTER
FELT RING
WIPER RETAINER
WIPER
"O" RING
FWD
30.02.32.056 A
C
PISTON
"O" RING
SPECIAL TOOL DETAIL

Figure Detail

(9) Manually unlock NLG jury brace and roll nose wheels forward until piston is extended far enough to expose spare "O" ring packings. — B

NOTE: Spare "O" rings are stored in the two uppermost grooves of the bearing. It is not necessary to remove the piston from the cylinder unless the spares have been used.

(10) Cut and remove worn "O" rings from bearing and piston without damaging backup rings or packing grooves. — B,C

D. Install NLG Shock Strut Seals.

(1) Replace worn "O" rings with the spare "O" rings. The spare in the uppermost groove of bearing is for bearing OD. Bottom spare "O" ring is for bearing ID. — B,C

NOTE: If piston is removed from strut cylinder, install new spare "O" rings. Lubricate parts with hydraulic fluid, Specification MIL-H-6083 or MIL-H-5606, to facilitate assembly.

(2) Roll NLG wheels aft until piston is back in cylinder. Make certain lower cam assembly is properly positioned in cylinder (fore and aft keys aligned with keyways in cylinder) and NLG is in the down-and-locked position. — B

CAUTION: BE CAREFUL NOT TO NICK, MAR OR OTHERWISE DAMAGE FINISH OF SHOCK STRUT PISTON. USE PROTECTIVE COVERING AS NECESSARY.

(3) Using hydraulic jack at strut jack point, raise NLG wheels and slide the following parts back into cylinder assembly: bearing with "O" ring packings and backup rings, packing adapter, felt ring, wiper retainer, and wiper. Make certain these parts are properly seated. — B

NOTE: The elastomer (buna rubber seal) portion of the piston wiper may swell slightly during use, thus causing wiper reinstallation to be difficult. The elastomer may be cut and shortened, if necessary, to facilitate wiper installation; however, ends of cut elastomer must meet when installed on the metal scraper ring. The piston wiper must be replaced if metal scraping ring is damaged or if elastomer shows extensive nibbling or deterioration.

Figure Detail

(4) Thread gland nut, with "O" ring in OD groove, into cylinder assembly and tighten with spanner wrench. Torque gland nut to 20 to 40 foot-pounds. — B

(5) Align lock tab with gland nut and cylinder slots, and secure to flange of torque collar nut with two bolts, washers, and nuts. — B

NOTE: If position of torque collar nut was inadvertently changed, refer to 32-3-7, Removal/Installation NLG Torque Collar Assembly for proper torqueing procedure.

(6) Connect torque arms at apex. Twist disconnect handle one quarter turn and allow handle to retract inward and engage disconnect joint. — A

(7) Connect two quick disconnect clamps securing skid detector harness to the NLG torque arms. — A

(8) Connect skid detector harness at quick disconnect on skid detector housing. — A

(9) Connect brake line at quick disconnect on NLG. Turn quick disconnect knurled nut to its full extent of travel in a clockwise direction. At end of travel, knurled nut shall move inward and engage locks. — A

NOTE: Check that brake line quick disconnect is fully locked. The upper edge of knurled nut should be approximately flush with body of coupling.

(10) Service the NLG shock strut with clean hydraulic fluid and dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(11) Lower airplane wheels to the ground (refer to Chapter 7, LIFTING AND SHORING).

4. Removal/Installation NLG Shock Strut Piston

Scope of Work Involved.

The procedure for removing and installing the shock strut piston is the same as removal/installation of the shock strut seals except the piston is pulled clear of the strut cylinder.

CAUTION: AS THE PISTON IS PULLED CLEAR OF THE STRUT CYLINDER, BOTH PISTON AND CYLINDER MUST BE SUPPORTED TO PREVENT DAMAGING THE METERING PIN.

NOSE LANDING GEAR (NLG) DRAG BRACE - MAINTENANCE PRACTICES

1. Servicing NLG Drag Brace (refer to Chapter 12, SERVICING)

2. Removal/Installation NLG Drag Brace (see Figure 201)

   A. Equipment Required. Airplane jacking equipment.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      LANDING GEAR POS & WARN.

      WARN HORN.

      ANTI-SKID NOSE POWER.

      (3) Check that landing gear ground safety pins are installed.

      (4) Release NLG door ground access latches and open NLG doors (refer to 32-14-0).

      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

      (5) Jack airplane as necessary to support airplane for safe removal of NLG drag brace (refer to Chapter 7, LIFTING AND SHORING).

   C. Remove NLG Drag Brace.

      (1) Remove clamp securing electrical harness to NLG jury brace and disconnect harness from down-lock up-lock switch (refer to 32-10-4).

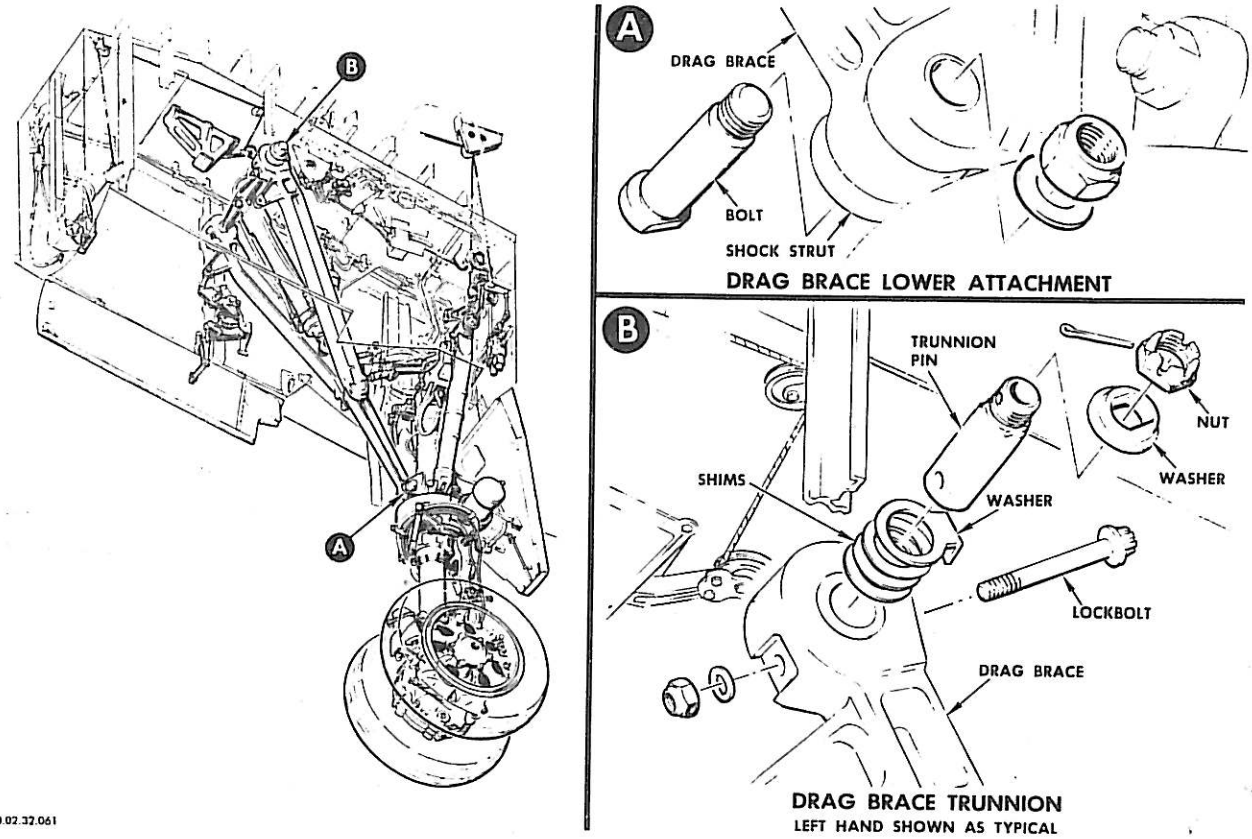
      (2) Remove NLG actuating cylinder (refer to 32-4-4).

      (3) Remove NLG bungee spring and jury brace (refer to 32-3-3).

      (4) Disconnect left and right door mechanism links from NLG drag brace (refer to 32-14-2).

      (5) With NLG drag brace adequately supported, remove nut, washer, and bolt securing lower end of drag brace to NLG shock strut.

      (6) In the left and right electrical equipment "tunnel" compartments, remove cotter pins, nuts, and washers from drag brace trunnion pins.



Nose Landing Gear Drag Brace Installation
Figure 201

(7) Remove trunnion pin lockbolts and nuts; remove trunnion pins, washers, and shims.

NOTE: Record thickness of shims on trunnion pins, to facilitate drag brace installation.

(8) Remove NLG drag brace from airplane.

D. Install NLG Drag Brace.

(1) Place NLG drag brace in position in nose wheel well and align trunnion pin washers and laminated shims (preliminary shim thickness determined in step C.(7) of removal procedure) with trunnion pin holes; install drag brace trunnion pins. Add or remove shim laminations at each trunnion to ensure alignment of drag brace with shock strut. Maintain 0.010 to 0.020 inch sideplay between left and right trunnion inboard support bushings (refer to 32-3-0, Figure 201).

NOTE: Trunnion shim laminations are 0.003 inch thick. Install trunnion washers with tabs at aft side of drag brace.

(2) Rotate drag brace trunnion and trunnion pins to align lockbolt holes, install lockbolts and nuts.

(3) In the left and right electrical equipment "tunnel" compartments, install trunnion pin washers and nuts. Adjust drag brace trunnion clearances (refer to 32-3-0, steps 2.D.(4) and 2.D.(5)), and secure trunnion pin nuts with cotter pins.

(4) Deleted.

(5) Align lower end of NLG drag brace with clevis on forward side of shock strut and secure with bolt, washer, and nut.

NOTE: The drag brace is properly aligned with shock strut when trunnion clearances are within tolerances and all rotating joints in the drag brace and shock strut are free from binding during gear retraction and extension cycle.

(6) Temporarily connect left and right NLG door mechanism links to horns on drag brace (refer to 32-14-2).

(7) Install NLG jury brace and bungee spring (refer to 32-3-3).

(8) Install NLG actuating cylinder (refer to 32-4-4).

(9) Connect electrical harness to NLG down-lock up-lock switch on jury brace and secure harness to jury brace with clamp (refer to 32-10-4).

(10) Remove warning tags and close circuit breakers opened in step B.

(11) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0).

NOTE: If only the NLG drag brace has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(3), 2.C.(5), 2.D.(7) thru 2.D.(11), and 2.D.(14). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

(12) Deleted.

NOSE LANDING GEAR (NLG) JURY BRACE - MAINTENANCE PRACTICES

1. Servicing NLG Jury Brace (refer to Chapter 12, SERVICING)

2. Removal/Installation NLG Jury Brace (see Figure 201)

   A. Equipment Required. Airplane jacking equipment.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD PUMP MOTOR CONT.

      LANDING GEAR POS & WARN.

      WARN HORN.

      ANTI-SKID NOSE POWER.

      (3) Check that landing gear ground safety pins are installed.

      (4) Release NLG door ground access latches and open NLG doors (refer to 32-14-0).

      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

      (5) Jack airplane as necessary to support airplane for safe removal of NLG jury brace (refer to Chapter 7, LIFTING AND SHORING).

   C. Remove NLG Jury Brace.

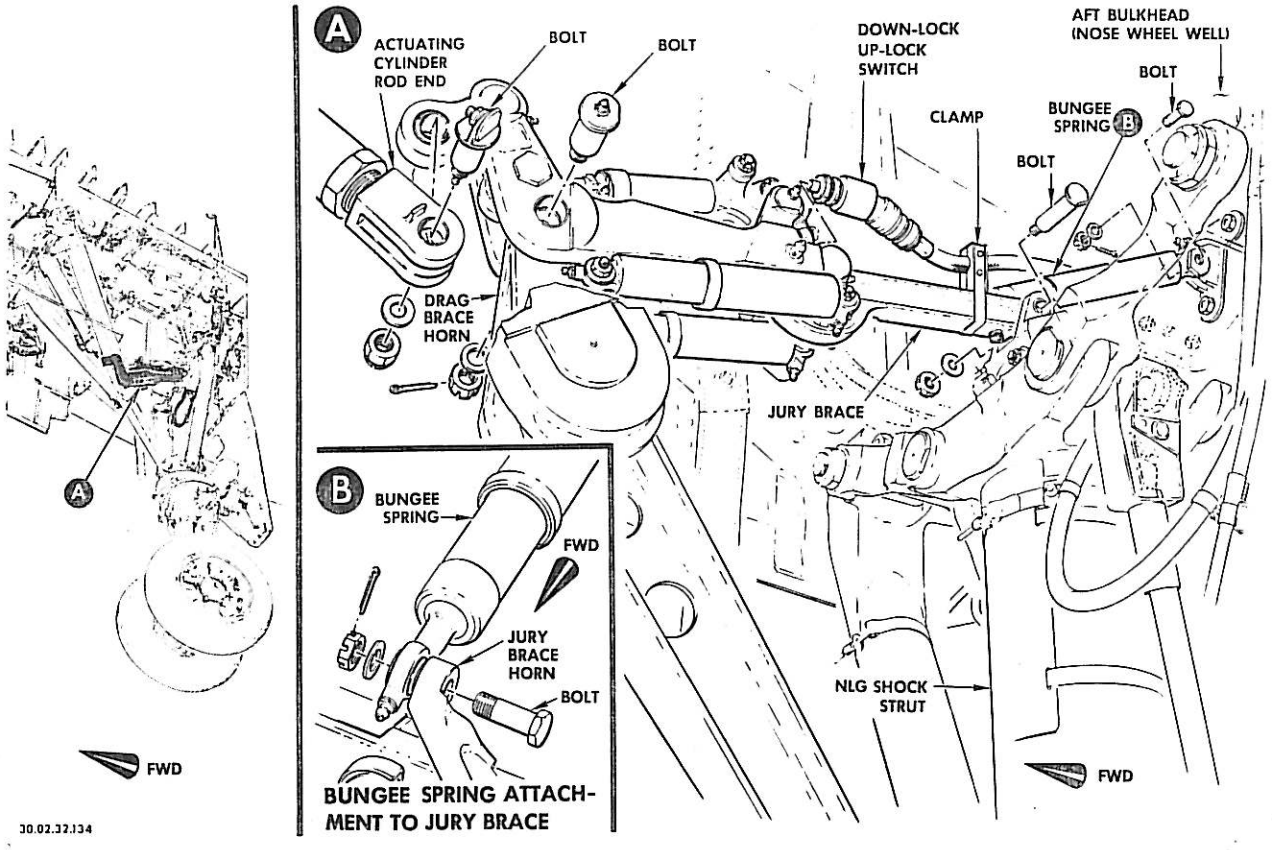
      (1) Remove clamp securing electrical harness to NLG jury brace and disconnect harness from down-lock up-lock switch (refer to 32-10-4).

      (2) Remove NLG actuating cylinder (refer to 32-4-4).

      (3) Remove cotter pins, nuts, washers, and two bolts attaching NLG bungee spring to NLG jury brace and aft bulkhead of nose wheel well; remove bungee spring.

      (4) Remove cotter pin, nut, washer, and bolt securing jury brace to the NLG drag brace.

      (5) Remove nut, washer, and bolt attaching aft end of NLG jury brace to upper end of shock strut; remove jury brace.



Nose Landing Gear Jury Brace Installation
Figure 201

D. Install NLG Jury Brace.

(1) Attach forward end of NLG jury brace to the drag brace with bolt, washer, and nut. Secure nut with cotter pin.

(2) Secure aft end of NLG jury brace to upper end of shock strut with bolt, washer, and nut.

(3) Align bungee spring with attachment fittings on NLG jury brace and aft bulkhead of the nose wheel well; secure with bolts, washers, and nuts. Secure nuts with cotter pins.

(4) Install NLG actuating cylinder (refer to 32-4-4).

(5) Connect electrical harness to down-lock up-lock switch on NLG jury brace and secure harness to jury brace with clamp (refer to 32-10-4).

(6) Remove warning tags and close circuit breakers opened in step B.

(7) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0).

NOTE: If only the NLG jury brace has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(3), 2.C.(5), and 2.D.(6) thru 2.D.(11). Reconnect links disconnected in step 2.C.(3) following adjustment. Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

(8) Deleted.

NOSE LANDING GEAR (NLG) TOWING CUPS - MAINTENANCE PRACTICES

1. Removal/Installation NLG Towing Cups

The NLG towing cups are coated with epoxy primer prior to installation and pressed into each end of the NLG inner axle. Before removing the towing cups, the NLG inner axle must be removed from NLG to prevent damaging the skid detector drive and/or axle. Refer to 32-3-5, Removal/Installation NLG Wheels and Tires for inner axle removal and installation procedures. Refer to the Overhaul Manual for specific instructions on replacement of the towing cups.

NOSE LANDING GEAR (NLG) WHEELS AND TIRES - MAINTENANCE PRACTICES

1. Servicing NLG Wheels and Tires (refer to Chapter 12, SERVICING)

Figure Detail

2. Removal/Installation NLG Wheels and Tires (see Figure 201)

A. Equipment Required.

(1) Wedge assembly (Hydro-Aire 40-433156) for disengaging the NLG skid detector.

(2) Hydraulic jack.

(3) Bead breaking device for breaking tire beads loose from wheel flanges.

(4) Axle thread protector.

B. Materials Required.

(1) Laundry soap, bar soap, or detergent solution to clean replacement tire.

(2) Denatured alcohol, Specification MIL-A-6019, to clean wheel flange bead seats and wheel mating surfaces.

(3) Dow Corning Silicone Insulating and Sealing Compound DC-4, to lubricate wheel "O" ring seal.

(4) Antiseize compound, Specification MIL-T-5544, to lubricate wheel tie bolts.

(5) Insignia red aircraft enamel, Specification MIL-E-7729, Type 1, to mark wheel and tire to determine wheel slippage in service.

(6) Wheel bearing grease, Specification MIL-G-25760.

NOTE: AEROSHELL Grease 5 (Shell Oil Co.), Specification MIL-L-3545A, is an approved substitute for the referenced wheel bearing grease. However, if substitute grease is used, parts must be thoroughly cleaned of former lubricant as greases are not compatible.

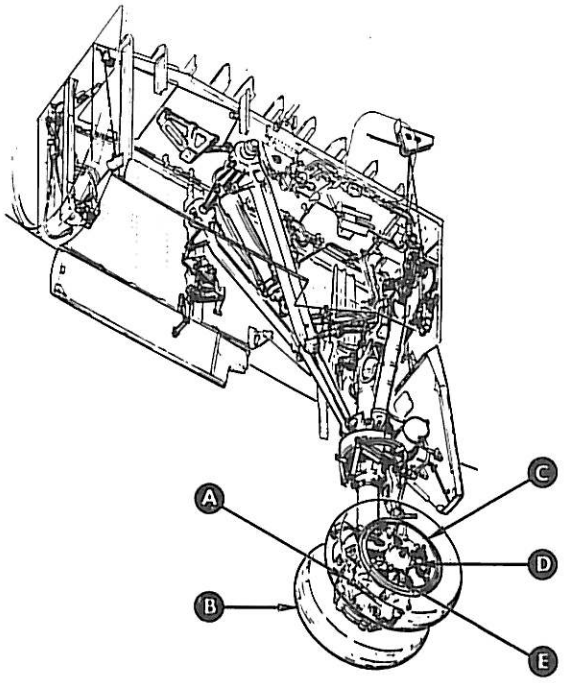
C. Preparation.

(1) Install wedge assembly (fork) on NLG skid detector disengage pin, to release skid detector drive. A

(2) Check that landing gear ground safety pins are installed.

(3) Jack nose gear until wheels are clear of ground (refer to Chapter 7, LIFTING AND SHORING). Use hydraulic jack at nose gear jack pad.

(4) If tire is inflated, mark any leaking thermal fuse bolts.



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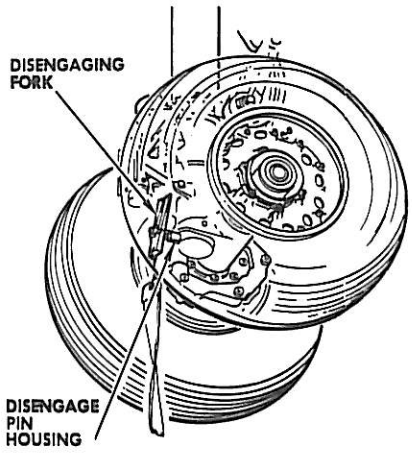
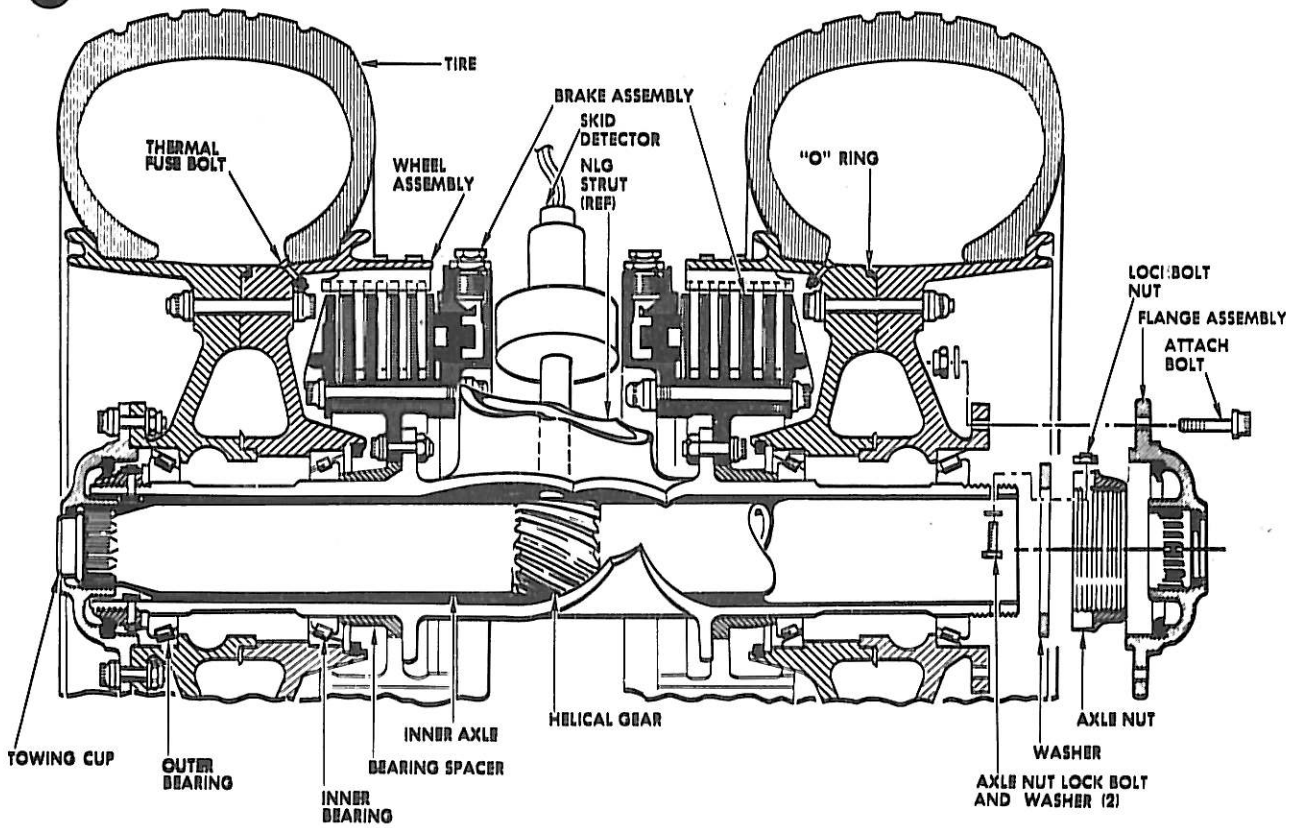


SKID DETECTOR DRIVE DISENGAGEMENT

B



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CROSS SECTION—AXLE AND WHEEL ASSEMBLY